PIT AND QUARRY

JULY 1952

24th Annual Cement Mills Number

New Plants of Marquette Cement Mfg. Co., Canada Cement Co., and Caribbean Cement
Cement Mix Control • Wet Process Burning
North American and Monolith Improvements
Reports of Agricultural Limestone, Lime and Industrial Sand Association Conventions

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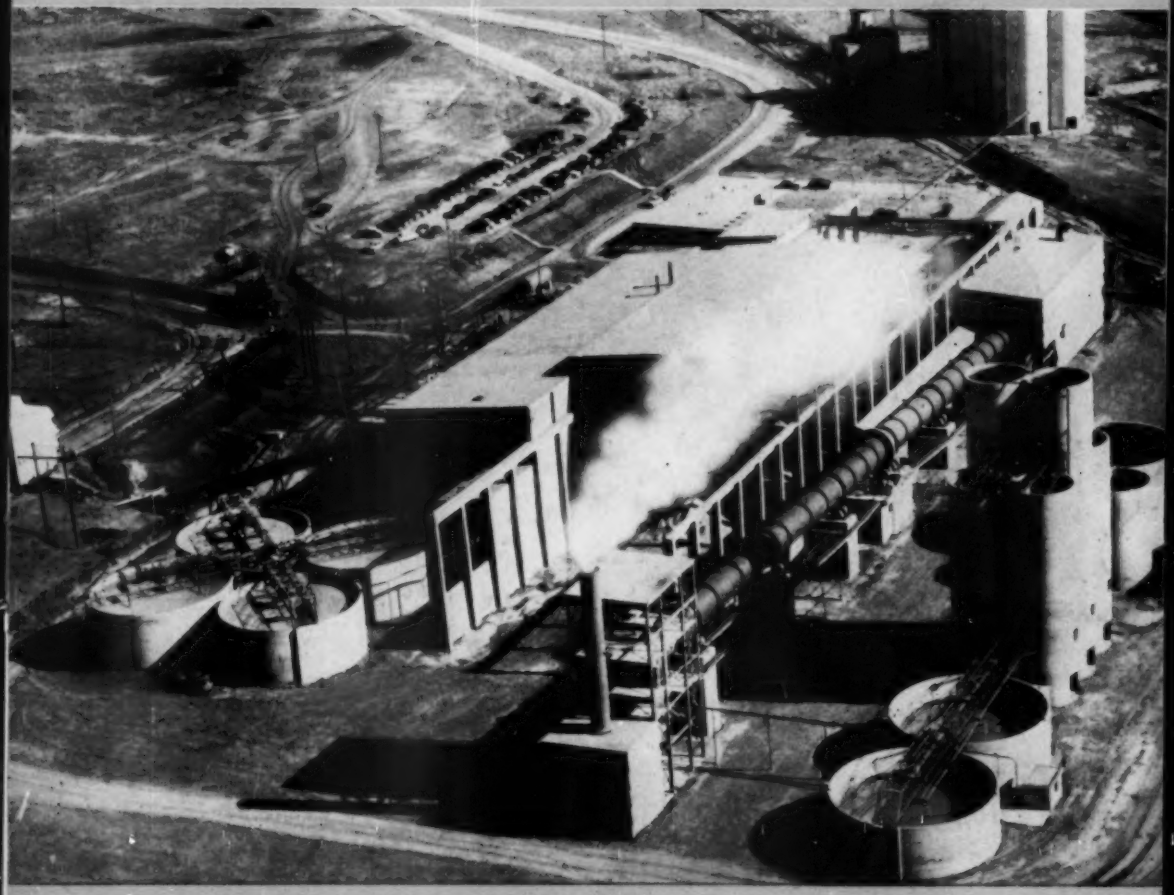


New Plant of Marquette Cement Mfg. Co. at Brandon, Miss.
(See Page 104.)

H&L TOOTH COMPANY

(Pioneer Manufacturers of Two-Part Teeth)

1540 SOUTH GREENWOOD AVENUE

MONTEBELLO CALIFORNIA

3 Times the service

ON TRAP ROCK CONVEYOR

ORIGINAL belt lasted 3 years before wearing through in handling rough, abrasive trap rock up to 12" lumps in size.

G.T.M.—Goodyear Technical Man—recommended Stacker Conveyor Belt which has served more than three times as long. Belt is still in service after handling 1,458,233 tons.

LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

GOODYEAR

THE GREATEST NAME IN RUBBER

PIT AND QUARRY, July, 1952, Vol. 45, No. 1. Published monthly by the Complete Service Publishing Company, 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $3 additional for each year. Single copy 50 cents. Entered as second-class matter February 28, 1952, at the Post Office at Chicago, Ill., under the Act of March 3, 1879.

A SCHRAMM

Pneumatractor

DEMONSTRATION WILL PROVE

IT CAN

PUSH front end loader with bucket (illustrated), or angle dozer blade, rotary sweeper, snow plows, etc.

PULL anything a wheel tractor will and also with front or rear winch.

POWER any hydraulically, mechanically and pneumatically operated equipment such as back hoe (illustrated), post hole digger, scaffold boom, etc.

PROVIDE AIR for any pneumatic tools that can be operated from a 105 C.F.M. AIR COMPRESSOR.

SCHRAMM INC.

The Compressor People · WEST CHESTER · PENNSYLVANIA

A phone call (West Chester 2500) or letter to Schramm Inc., West Chester, Pa., will arrange a demonstration or provide animated colored sound film.

SCHRAMM AIR COMPRESSORS

Another Vulcan Kiln in Tennessee

REPEAT orders are the surest indication of satisfactory service. In 1928 a well-known Tennessee cement company installed two Vulcan rotary kilns, each 10 feet x 215 feet, for manufacturing Portland cement by the dry process. During nearly a quarter-century of practically continuous operation these two kilns have given, and still give, such satisfactory service that another Vulcan kiln has recently been installed to provide 60% additional capacity.

The new Vulcan kiln, shown above, is much longer (10 feet x 300 feet) and is equipped for wet operation; thereby permitting higher overall efficiency. Other improved features include a heavily reinforced all-welded steel shell mounted on our latest-type supporting roller and thrust bearings; all of which are automatically lubricated and easily adjusted to compensate for wear and moderate misalignment.

The main drive unit is fully enclosed and the gasoline-engine auxiliary-drive unit is as fully enclosed as possible; to promote cleanliness and safety. Both drives provide an ample margin of power over any probable requirement and are designed for many years of trouble-free service.

Every part of every Vulcan Kiln is designed and built with an extra margin of protection against mechanical troubles of every kind and that's why long-time users often order additional units from us without competition. They know that any necessary difference in first cost will be repaid many times over in greater freedom from breakdowns, shutdowns, and other operating expense.

THIS BOOKLET TELLS WHY VULCAN KILNS ARE BETTER

and why they give more years of trouble-free service. Its 28 fully-illustrated pages are packed with specific information regarding the design and construction of Vulcan Rotary Kilns, Coolers, Dryers and other related products. No charge or obligation. Write for Bulletin No. A-442, giving name of your company.

Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

New York City Office, 50 Church Street

Other Vulcan Products include Briquetting Machinery, Electric Hoists, Mining Machinery, Open Hearth Steel Castings, Heavy Special Machinery and all types of Modern Industrial Locomotives Bulletins on request.

Gates V-Belts are chosen to keep HELICOPTERS aloft!

McCulloch Tandem-Rotor Helicopter

(Above) Two-place helicopter employs tandem-mounted, intermeshing rotors—a total of six rotor blades—powered by a 200-hp, six-cyl., aircooled horizontal engine installed at the rear. (Lower left) Gates-engineered V-BELTS, shown to rear of the engine, transmit power from the engine to the main drive shaft which in turn drives the reduction gearing for the rotors.

Because a helicopter is air-borne entirely by the turning of its rotors, McCulloch Engineers who designed this helicopter and supply it to the Navy had to be sure that the drive to the rotors was, above all, safe and reliable—a drive that would not fail when the helicopter was in the air.

The special difficulty in designing this drive was the extreme *compactness* required.

On small diameter pulleys and short center distances, the drive must handle 200 horsepower for 1000 hours at cruising speed and 500 hours at high speed. Ordinarily, it would have been impossible to achieve these results.

A Notable Application of Gates SPECIALIZED Research

However, Gates had developed a V-Belt which in thousands of applications had proved to have the exact characteristics required for this helicopter drive—and Gates had also developed design data which showed at once the applicability of this belt.

It was not by accident, therefore, that Gates Engineers were at once prepared to supply a V-Belt capable of handling this most exacting assignment and —in close co-operation with McCulloch Engineers—they developed the drive shown which has most successfully met all requirements.

Gates readiness to meet successfully *any* V-Belt Drive assignment is possible because Gates runs an *average* of 32,000 hours of testing *every week* on V-Belts alone! (32,000 hours is equivalent to *five years* of life for one belt.)

And the real value to you of such exhaustive testing is this: Laboratory findings are carefully checked by tests made under actual field conditions and the *results* are at once reduced to *usable data* for the design of V-Belt Drives to *perform whatever task may be required!*

Phone for a Gates Field Engineer

If you have a difficult drive to design, or if some drive in your plant is giving trouble, or if you only want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on any particular drive—you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

ENG-522

Gates VULCO ROPE DRIVES

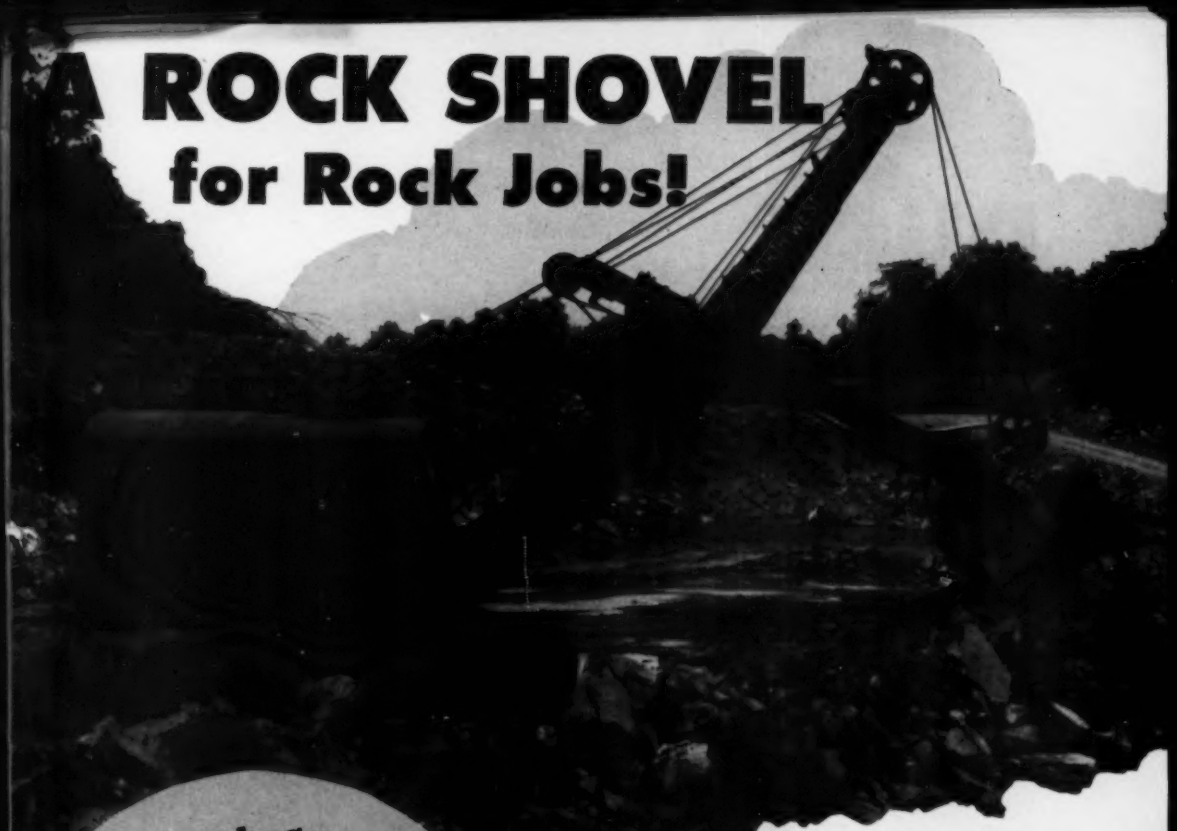
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY

DENVER, U. S. A.

The World's largest Makers of V-Belts

A ROCK SHOVEL for Rock Jobs!



Another ROCK SHOVEL makes THREE NORTHWESTS for STUNTZ-YEOMAN CO. Delphi, Ind.

TAKE a look at this rock problem of Stuntz-Yeoman's in Indiana. The Northwest advantages that make Northwest a *real* Rock Shovel solve problems like this profitably.

The Northwest Dual Independent Crowd utilizes force that most other independent crowd shovels waste. The Cushion Clutch makes high engine power safer, reduces shock overloads on parts under power, cuts wear and tear on equipment and increases cable life. Uniform Pressure Swing Clutches (and, remember, no outside or inside band clutch is a uniform pressure clutch) take the machine wracking jerks and grabs out of swinging, makes spotting the load smooth and easy and add their bit to increasing capacity. Simplicity of design and get-at-ability makes upkeep easy and reduces "down time".

These are just a few of the things that make Northwest a real Rock Shovel and remember, if you have a real Rock Shovel you never have to worry about output in other types of digging.

You can't afford anything but the best for your job. Why not plan ahead to put a Northwest on your future contracts? It will pay you to place an order and be sure of a *real* Rock Shovel!

NORTHWEST ENGINEERING COMPANY
1515 Field Building • 135 South LaSalle Street • Chicago 3, Illinois

NORTHWEST

Convertible for any Mining Material Handling or Excavation Problem

DUCK TROUBLE...

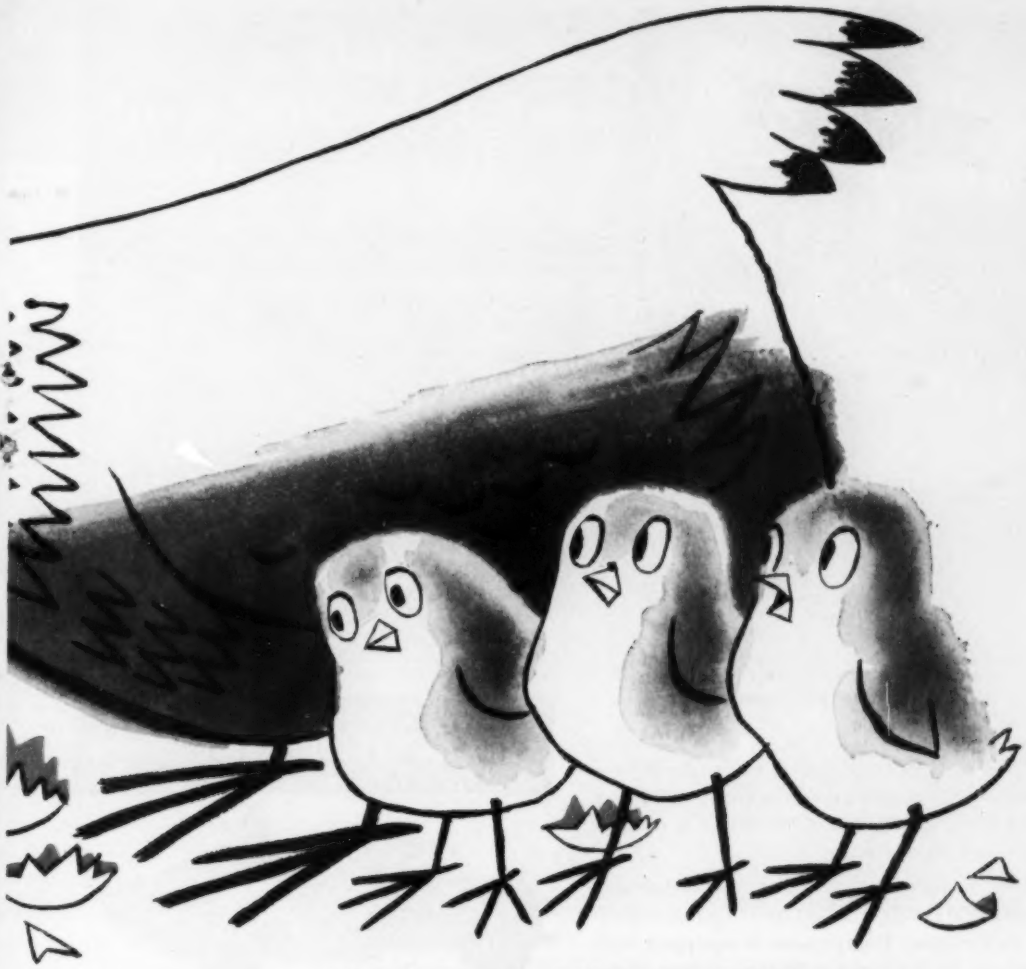
You eliminate chances of error in the lubrication of your automotive gears when you use Mobilube GX—the multi-purpose gear lubricant!

Applying the *wrong* lubricant to your automotive gears—*a mistake which can cost you plenty*—just isn't possible when you use *Mobilube GX!*

This single, multi-purpose lubricant gives full protection to all your automotive gear units—hypoid, spiral bevel, helical, and spur—greatly simplifies application proce.' ures—permits you to reduce inventory, paper w ork, storage space.

Mobilube GX is top quality . . . guards gears agai st corrosion, rust and wear. It resists foaming, does not channel, will not form deposits or separate in storage. It greatly prolongs gear life, gives exceptionally long service, makes shifting easier and quieter.

Mobilube GX comes in several SAE grades to meet all your gear requirements. Put in a supply today—and avoid gear lubrication troubles in the future.



Here's Practical Help for Contractors . . .

SOCONY-VACUUM

Socony-Vacuum gives you . . .

- Help on maintenance problems.
- Individual, tested lubrication schedules.
- Advice on correct application of lubricants, proper handling and storing.
- One source of supply—available everywhere.
- Simplified inventory—with . . .

1. **DELVAC OILS**—for all gasoline and automotive-Diesel engines.
2. **MOBILUBE GX**—multi-purpose gear lubricant for all enclosed gears—manually operated transmissions, rear axles and final drives.
3. **MOBILGREASE**—in grades and types for proper lubrication of all chassis parts and engine accessories.

CORRECT LUBRICATION *for Contractors*

THE FLYING RED HORSE COMPANIES: SOCONY-VACUUM OIL COMPANY, INC. MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

DAVEY

sets new standards of compressor operating efficiency!

Davey Model 315 (Diesel)

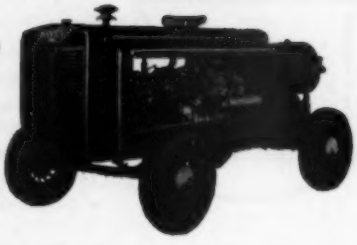
● Regardless of the nature of your compressed air requirements, you can specify Davey and be sure you will receive the utmost in efficient service and dependability.

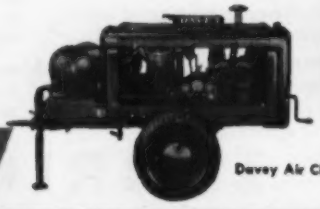
Davey manufactures a complete line of portable and stationary units from 60 to 315 c.f.m. capacities. Every Davey Compressor is equipped with *Permanent Peak Efficiency* lifetime valves. These never carbon or foul . . . do not require cleaning or replacement . . . keep operating tools functioning at full capacity.

There's a Davey for every compressor need!

Davey Auto-Air Model 105

Davey Air Chief Model 210





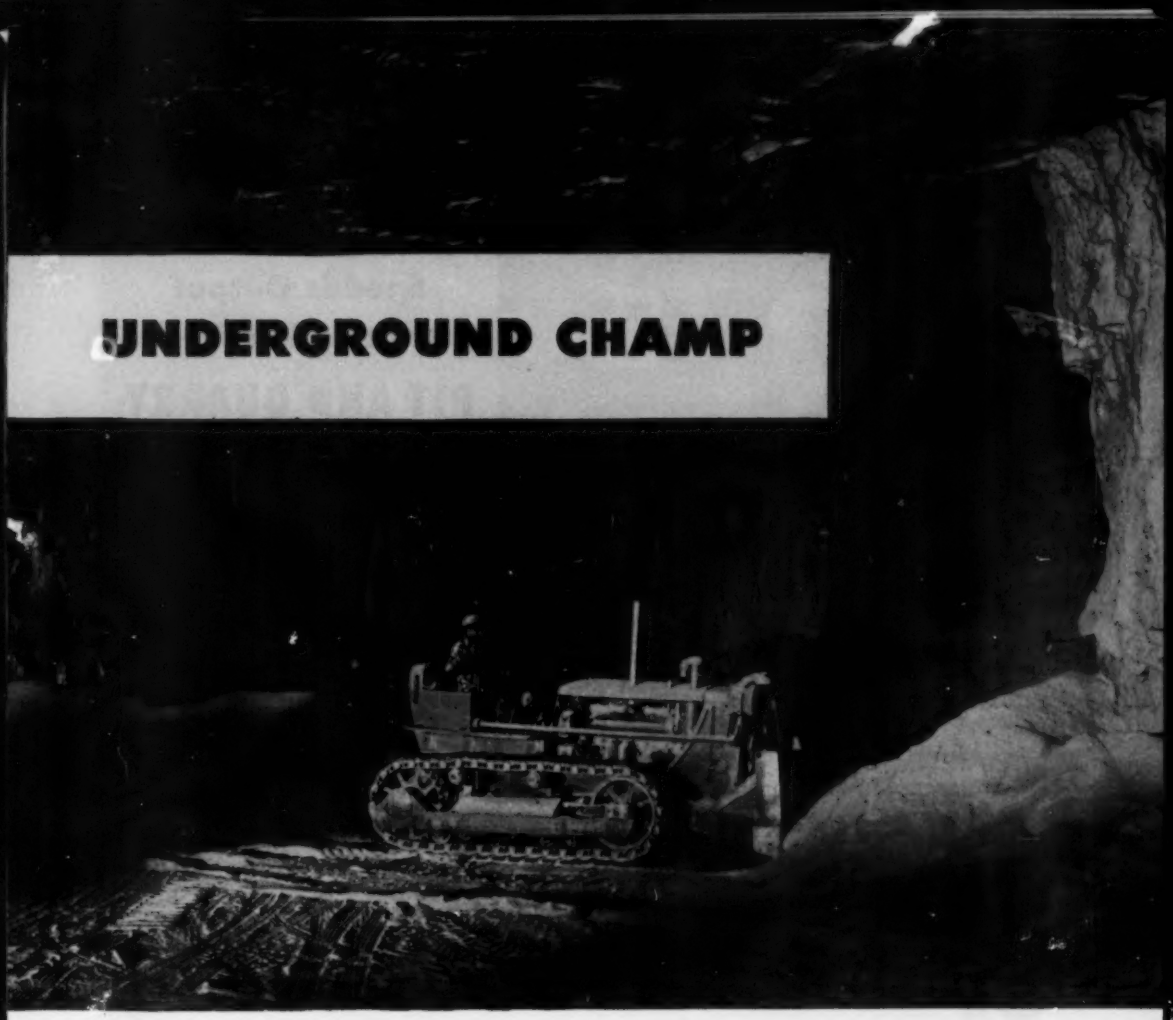
Davey Air Chief—Model 105

DAVEY

DAVEY COMPRESSOR CO.

KENT, OHIO

UNDERGROUND CHAMP



Each day a thousand tons of limestone come up from this Black White Lime Company mine near South Quincy, Ill. Here a "Caterpillar" Diesel D6 Tractor and No. 6S 'Dozer help keep that production rolling.

Right at home underground, this rugged D6 stands up against the worst kind of abrasive soil conditions, its vital parts sealed against damage. And the curved blade picks up capacity loads hour after hour. Working with this dependable team are two "Cat" Diesel D4 Tractors with loaders, a Lorain TL-25 Shovel and a "Caterpillar" Diesel D315 Engine. "We switched to all-'Cat' equipment because it's much more dependable," Vice-President W. G. Black says. "In this business, dependability is of prime importance. If you're down, it disrupts all your plant."

Mr. Black knows that dependability is built right into his big yellow machines. On his No. 6S 'Dozer, for instance, side arms are of tough box section construction; the curved blade is made of special high tensile steel; the high carbon steel cutting edge combines hardness and toughness in just the right degree; even the end bits on the blade are of alloy steel specially treated for longer, harder wear.

"Caterpillar" Bulldozers are built to match the power output of their running mates, "Cat" Diesel Tractors. They offer a choice of hydraulic or cable control, straight or angling type blade, and they adjust easily for tilt and pitch. There's a size for any job, above or below ground. Drop in and see your nearby "Caterpillar" Dealer for the full story.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

"QUICK-WAY"

Reg. U.S. Pat. Off.

Speeds Output Increases Profits for PIT AND QUARRY OPERATORS

Whether its moving shot rock, sand, or crushed stone, stripping overburden or charging bins, you'll find the "QUICK-WAY" in a class by itself in the ¼ to ½ yard field.

The "QUICK-WAY" features low center of gravity, works easily over the side, has proper balance for truck operation, gives you easy, fast swinging, plenty of reserve power, rugged all steel construction, numerous parts interchangeable. 4 models, ¼ to ½ cubic yard shovel, clamshell, dragline, backhoe, 3 to 10 ton crane capacity. Truck speeds to and from jobs. Low initial cost. Low maintenance costs. Eight different attachments.

With a "QUICK-WAY" you'll roll up yardage records hour after hour, day after day. Ask your distributor for a free demonstration or mail coupon.

"QUICK-WAY" Model E dragline with 30' boom loading gravel

"QUICK-WAY" truck shovel, loading sand

Clinker is handled from the pit to the storage pile and from the storage pile to grinding circuit with a mobile "QUICK-WAY" crane

"QUICK-WAY"
TRUCK SHOVEL CO.
Denver, Colorado, U.S.A.

MAIL COUPON TODAY

"QUICK-WAY" TRUCK SHOVEL CO.
Dept. 78 • 2401 East 40th Ave. • Denver 1, Colorado

Please send me complete details on "QUICK-WAY" Truck Shovels —four different models from 3 to 10 ton crane capacity.

Name _____

Address _____

City _____ *State* _____

over-all service...

The responsibility of the Torrington engineer does not end with a recommendation for a particular type of anti-friction bearing. He makes every effort to "follow through" to see that the bearing continues to give the best possible performance, with a minimum of maintenance.

Over-all service—starting with the original design and continuing through in-service operation—has helped to produce the *lasting* solution to the friction problems of many manufacturers. Why not discuss *your* application with a Torrington engineer today?

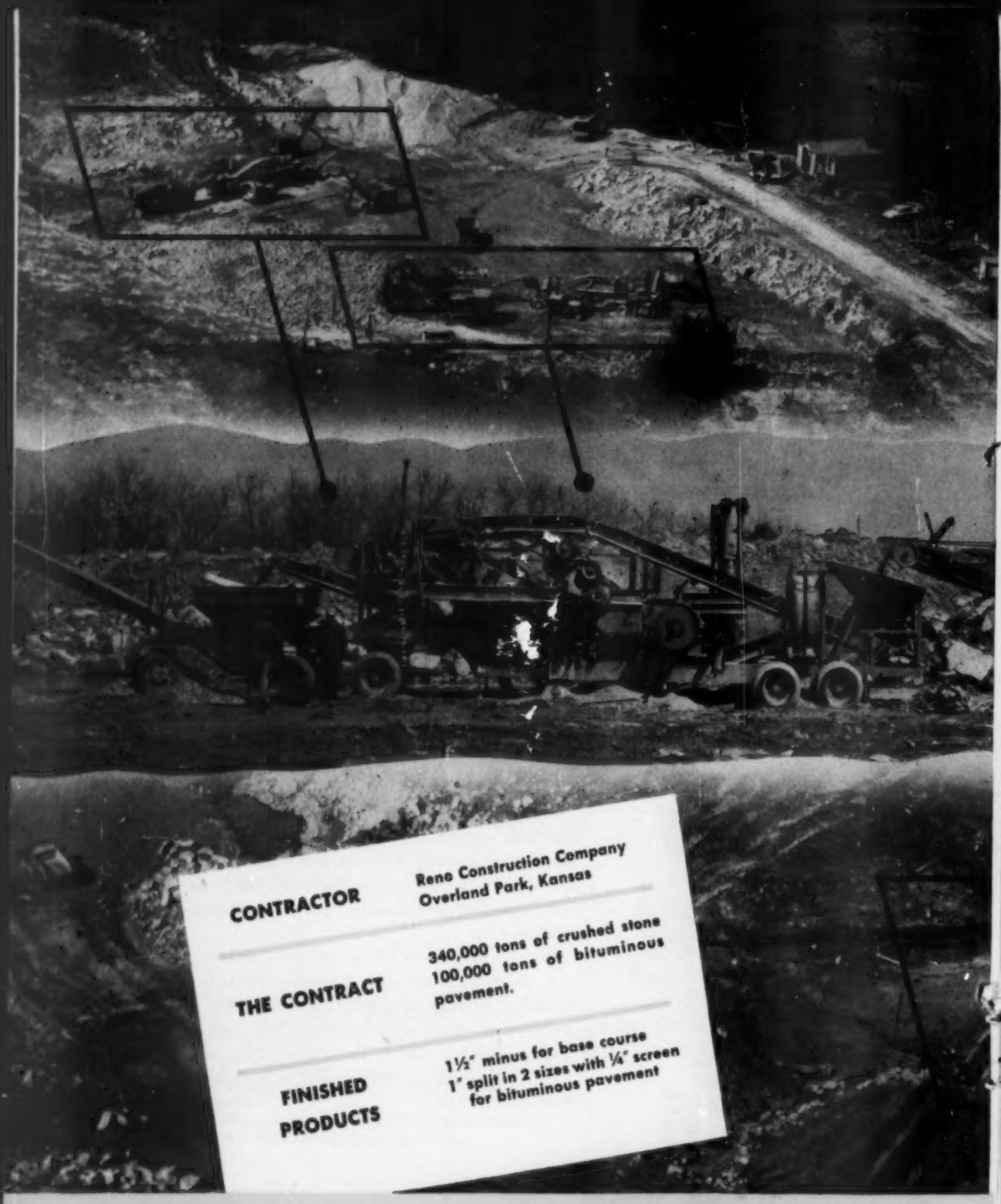
THE TORRINGTON COMPANY

South Bend 21, Ind. Torrington, Conn.

District Offices and Distributors in Principal Cities of the United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers


CONTRACTOR
Reno Construction Company
Overland Park, Kansas
THE CONTRACT
340,000 tons of crushed stone
100,000 tons of bituminous pavement.
FINISHED PRODUCTS
1½" minus for base course
1" split in 2 sizes with ¼" screen for bituminous pavement

THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHERS • BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PLANTS • FEEDERS • PORTABLE POWER CONVEYORS • PORTABLE AND STATIONARY STONE, GRAVEL AND SAND PLANTS • REDUCTION CRUSHERS • BATCH TYPE AND VOLUMETRIC TYPE ASPHALT PLANTS • DRIERS • DUST COLLECTORS HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREAKERS

150 TONS PER HOUR AVERAGE FROM EACH OF THESE 3 CEDARAPIDS UNITIZED PLANTS

S. H. Reno says, *"One important factor in operating a successful contracting business is using the best equipment. We like Cedarapids modern plants, low maintenance and the excellent service and cooperation we get from Iowa and Iowa Dealers".*

Maurice Reno likes the portable features. *"In our quarry operations, we can pull out, make a shot, and be running again in less than an hour. That's real portability".*

. . . "THAT'S WHY WE BUY CEDARAPIDS!"

Say the Reno Brothers

Reno Construction Company, Overland Park, Kansas

IT'S production like this, consistently maintained with their Cedarapids equipment, that helps Reno Construction Company set a profitable pace on big jobs like their Olathe Naval Air Base contract. In this quarry, the Reno brothers are operating three Cedarapids Unitized Plants, each consisting of a 2236 Portable Primary and a 4033 Hammermill Secondary. Together, these three plants are *averaging* 450 tons per hour! The Reno brothers are also operating a Cedarapids Model E 4000-lb. Asphalt Plant to produce the 100,000 tons of bituminous pavement for resurfacing and extending the runways.

Reno Construction Company knows the worth of Cedarapids equipment from long experience. In 1942, they purchased their first Cedarapids Jaw Crusher and Screen, which are still producing. Since then, they've increased their operations, and they now own *six Cedarapids Unitized Plants and one Model E 4000-lb. Asphalt Plant,* with another Model E on order.

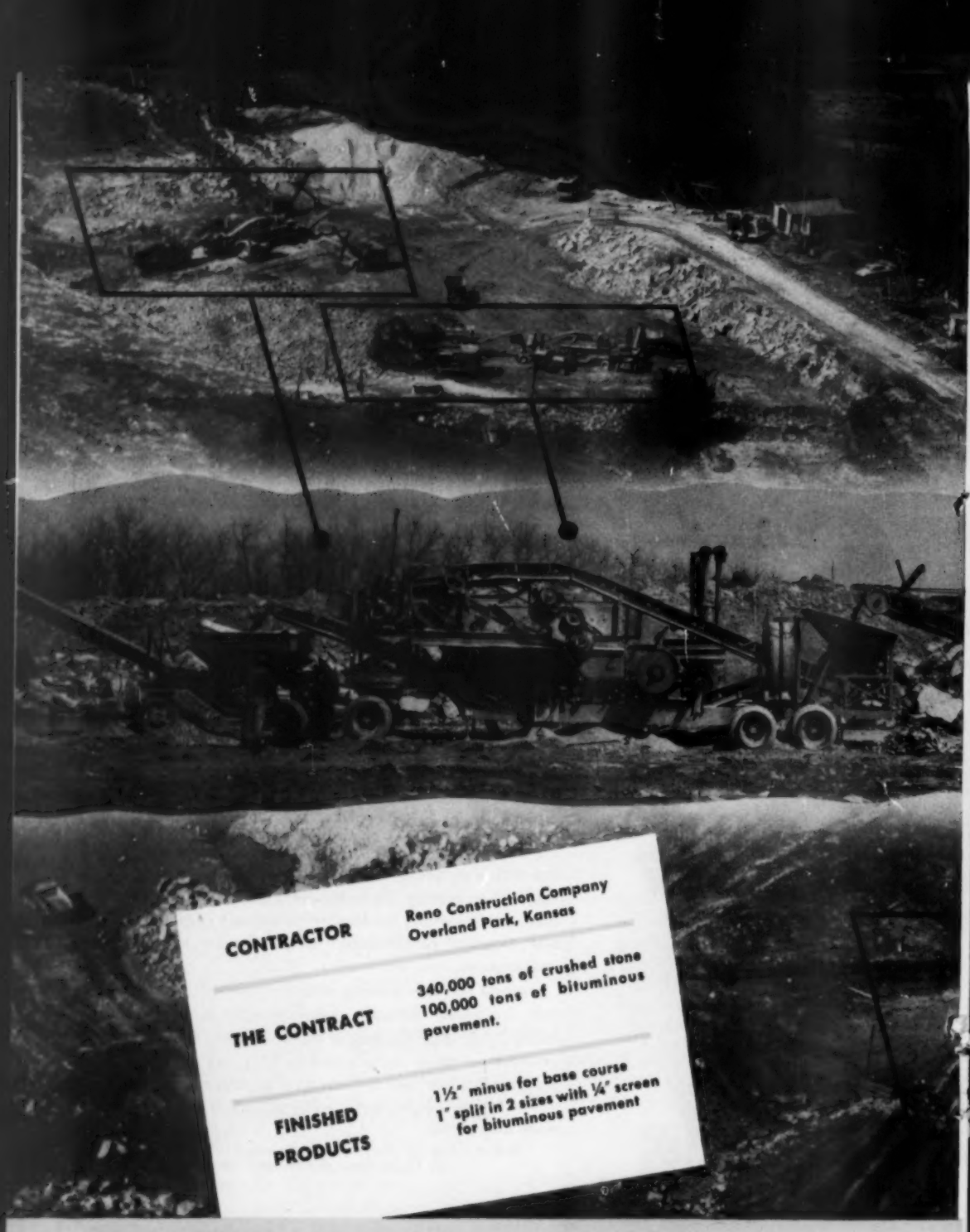
When a big outfit like Reno Construction Company is so completely sold on Cedarapids, you can be sure it will pay *you* to investigate Cedarapids advantages for your job. Why don't you check with your Iowa distributor today?

Cedarapids — Built by IOWA

Cedarapids Model E 4000-lb. Asphalt Plant working on Reno's Olathe Naval Air Base job.

IOWA MANUFACTURING CO.

Cedar Rapids, Iowa, U.S.A.



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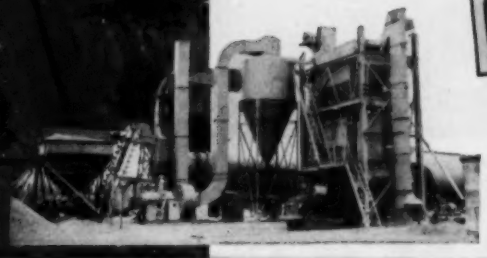

Cedarapids Model E 4000-lb. Asphalt Plant working on Reno's Olathe Naval Air Base job.

IOWA MANUFACTURING CO.

Cedar Rapids, Iowa, U.S.A.

SIX SIMPLICITY UNITS SCREEN, SCALP, AND FEED ALL RAW MATERIAL AND FINISHED PRODUCT AT LIGHTWEIGHT AGGREGATE CORP. PLANT, LIVONIA, MICHIGAN

This new lightweight aggregate plant, installed by Besser Mfg. Co. of Alpena, produces from raw clay a specialized aggregate used to manufacture extremely lightweight block. Six Simplicity units help speed production and improve the quality of these block which have a high structural strength that gives maximum insulation against heat, cold, and sound.

Simplicity equipment will help speed production and keep costs down in your operation, too. Write us today for complete information or consult a Simplicity sales engineer . . . there's one near you.

At the Lightweight Aggregate Corp. Plant, this 3' x 6' Simplicity Screen with 5/8" tubular deck takes clay from the crusher and discharges to a surge hopper on an intermittent cycle at the rate of 100 yards an hour.

The 12" x 8' Simplicity Pan Feeder shown here delivers coke breeze to the conveyor feeding the cintering machine at the rate of 10 yards per hour.

View of the 4' x 8' Simplicity Scalper (left) that removes 3/8" material from cinter coke discharged from the cintering machine. After cooling, the aggregate is screened to minus 5/16" sizes for the silo at the rate of 140 yards an hour on the 5' x 10' Simplicity Ball Tray Deck Screen (right). Oversize aggregate is returned to the crusher and then to a 5' x 10' Simplicity Grading Screen at the silo.

This 2' x 6' Simplicity Horizontal Screen on the coal line has a scalping deck on top. It sizes minus 1/8" coke breeze with a 13% moisture content for the Pan Feeder.

107

Sales representatives in all parts of the U. S. A.

FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

For Rock Loading

You can't beat an Eimco

Many companies are finding that the 104 is taking the place of two or even three pieces of other equipment.

The illustrations above show a 104 loading lime rock. The ore is loaded into trucks and between trucks the same 104 loads out the overburden and trams 100' to the dump.

We have proved to hundreds of users that the Eimco 104 is a high capacity, heavy duty rock loader of unequalled performance. Let us give you the facts.

Eimco 104 Loader

EIMCO

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

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IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD

A565

OUR 60TH ANNIVERSARY

PHILADELPHIA

FOR DEPENDABILITY

Like all quality-controlled products Philadelphia Worm Gear Units reflect not only the workmanship and materials used but also the experience of the maker. All these are strongly evidenced by the economical and dependable performance of thousands of these reducers in service throughout industry today.

The type AT unit shown here is one of a complete line built in a wide variety of horizontal and vertical styles with gear centers from 3" to 21". Ratios range from 3⅝:1 to 6300:1 to meet most any application.

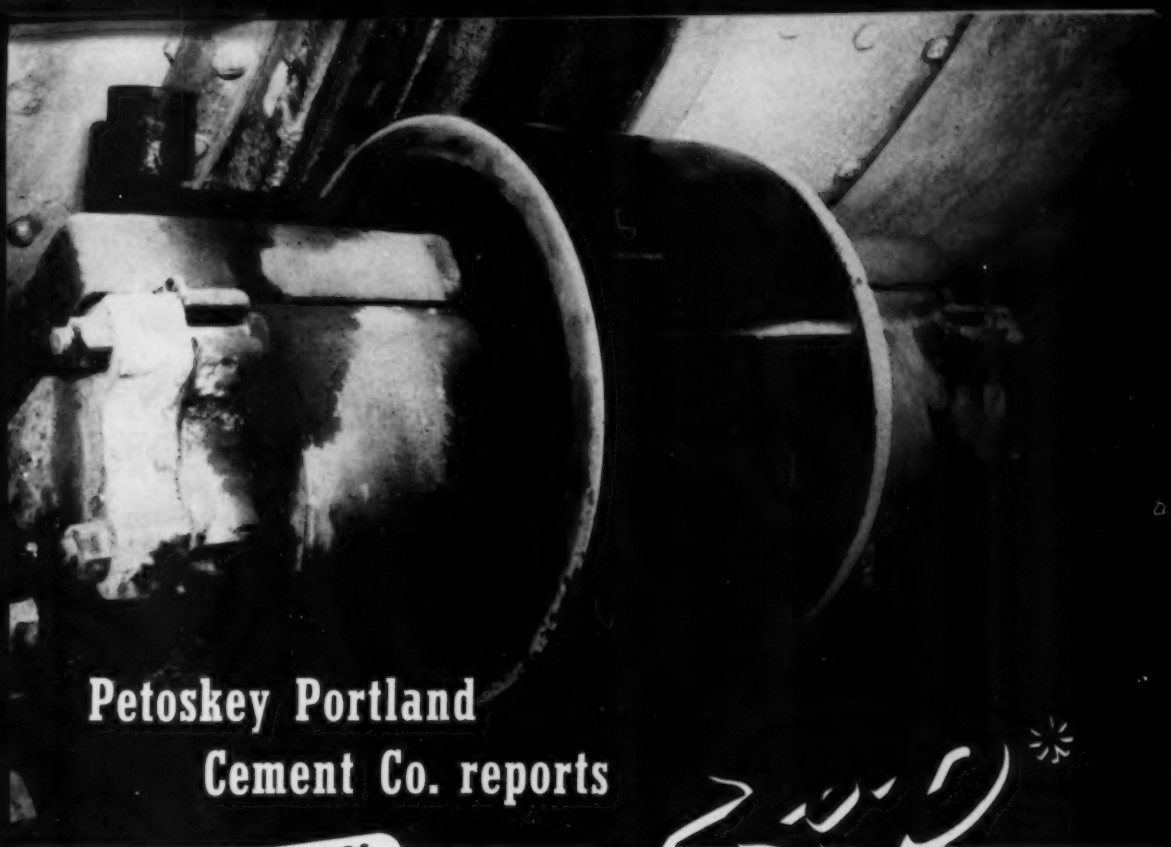
Our latest catalog WG-51 gives full details of our worm gear units. Write for a copy using your business letterhead.

PHILADELPHIA GEAR WORKS, INC.

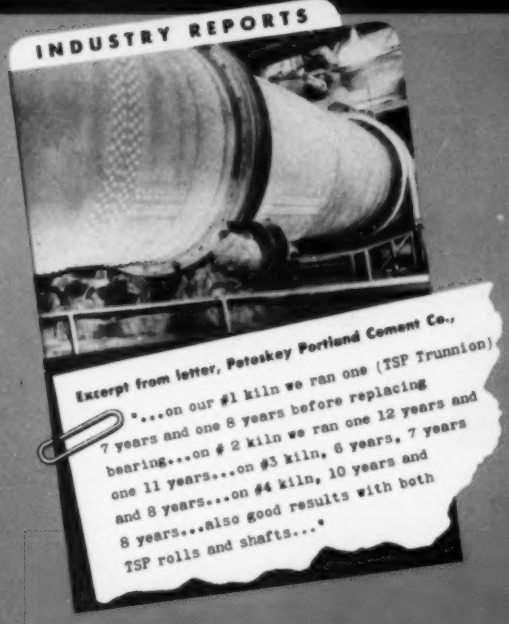
ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears & Speed Reducers

LinaTorque Valve Controls



Petoskey Portland Cement Co. reports TSP* trunnions outlast them all!


INDUSTRY REPORTS
Excerpt from letter, Petoskey Portland Cement Co.,
"...on our #1 kiln we ran one (TSP Trunnion) 7 years and one 8 years before replacing bearing...on # 2 kiln we ran one 12 years and one 11 years...on #3 kiln, 6 years, 7 years and 8 years...on #4 kiln, 10 years and 8 years...also good results with both TSP rolls and shafts..."

Petoskey Portland began installing "Tool Steel Process" Trunnions in 1940, completed installation on all 4 kilns by 1943. None has worn out to date. Eighteen TSP Trunnions are now in use. In addition to their long service life, they have been instrumental in smoothing the surface of the large tires.

TSP Shafts installed with these TSP Trunnions are showing the same phenomenal results. Prior to the installation of TSP Shafts, bearings had to be renewed every 2 years.

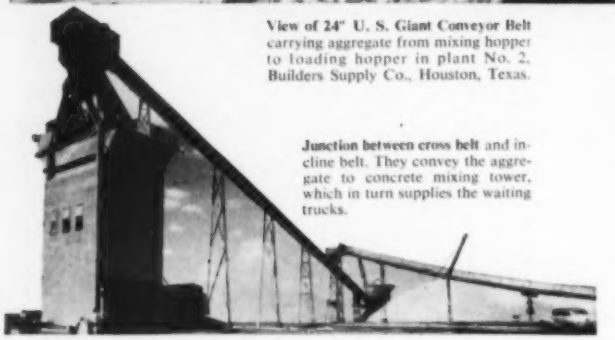
Next time you need replacement parts, specify "Tool Steel Process" parts. Savings in material, man hours and downtime will prove to you TSP superiority, as it has to hundreds of companies.

* TOOL STEEL PROCESS PRODUCTS
...the products that carry an absolutely positive GUARANTEE to give a longer life in the same service than any other product.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI 16, OHIO, U. S. A.

THE STANDARD OF QUALITY SINCE 1909 FOR GEARS • PINIONS • ROLLS • WHEELS AND OTHER HARDENED PRODUCTS

How U. S. Rubber belt engineers cut installation costs



View of 24" U. S. Giant Conveyor Belt carrying aggregate from mixing hopper to loading hopper in plant No. 2, Builders Supply Co., Houston, Texas.

Junction between cross belt and incline belt. They convey the aggregate to concrete mixing tower, which in turn supplies the waiting trucks.

In a new concrete mix plant, original plans called for the installation of a 5-ply, 36 oz. duck conveyor belt to handle the aggregates. But United States Rubber Company engineers pointed out that their 4-ply, 42 oz. duck belt would not only cost less, but would be more flexible crosswise to trough, would train more easily and provide high-tensile strength as well. This 1,275-foot, 4-ply U.S. Giant Conveyor Belt was installed. It travels 300' per minute and delivers 294 tons per hour.

This is another instance of why it pays to consult "U.S." engineers before going ahead on a conveyor belt problem. Remember that they are backed by a wealth of experience and vast research facilities. Finally, they will work with your engineers and with the designers of conveyor equipment—a 3-Way Engineering teamwork that always pays off in higher output at lower cost. Write to address below.

PRODUCT OF U.S. RUBBER — SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

ABOVE ALL... A SLING MUST BE SAFE!

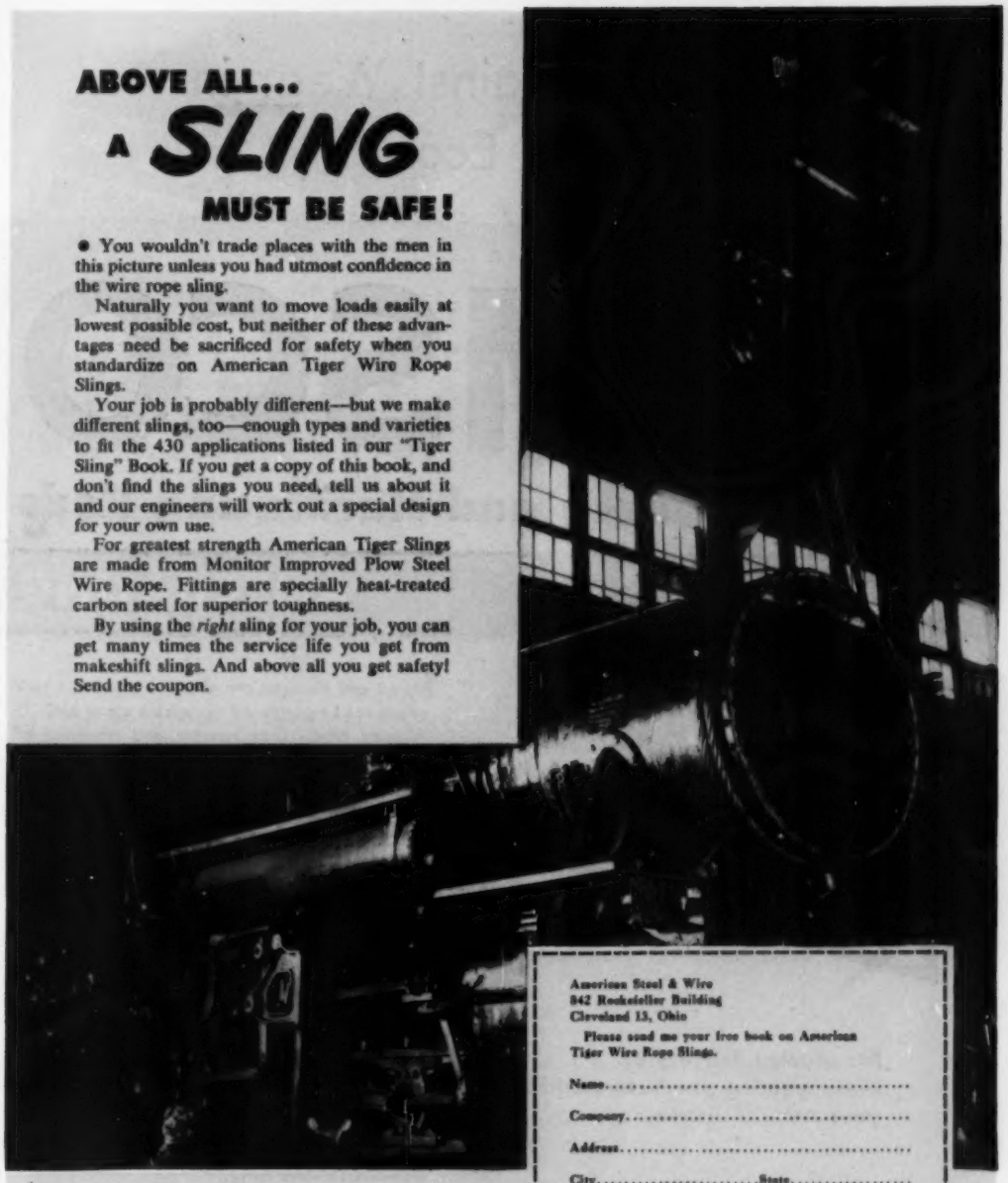
● You wouldn't trade places with the men in this picture unless you had utmost confidence in the wire rope sling.

Naturally you want to move loads easily at lowest possible cost, but neither of these advantages need be sacrificed for safety when you standardize on American Tiger Wire Rope Slings.

Your job is probably different—but we make different slings, too—enough types and varieties to fit the 430 applications listed in our "Tiger Sling" Book. If you get a copy of this book, and don't find the slings you need, tell us about it and our engineers will work out a special design for your own use.

For greatest strength American Tiger Slings are made from Monitor Improved Plow Steel Wire Rope. Fittings are specially heat-treated carbon steel for superior toughness.

By using the *right* sling for your job, you can get many times the service life you get from makeshift slings. And above all you get safety! Send the coupon.



American Steel & Wire
842 Rockefeller Building
Cleveland 13, Ohio

Please send me your free book on American Tiger Wire Rope Slings.

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Company.....

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UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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For the War Against Wear in the Fight for Economy

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THE RIGHT WAY TO SAY HARDFACING

Immediate Delivery

Impact and abrasion are always at work but their effects can be postponed through the use of AMSCO Welding Products. Reclamation and rebuilding of worn or damaged equipment parts by Amscoating means dollar-saving, long-lasting protection. The AMSCO Hardfacing System successfully fights wear caused by impact, abrasion, heat or corrosion. It assures longer equipment life and fewer repairs.

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AMSCO AW-79 will meet every requirement for better control of wear where abrasion and impact are important factors—plus all the advantages of automatic welding. Especially suitable for rebuilding and hardfacing tractor rollers, steel wheels, sheeting rolls, dredge pins as well as dozens of other applications. ½" and 5/16" in 22½" ID., 100 lb. coils.

AMSCO No. 459 for severe abrasion, mild impact. Has excellent abrasion resistance. All diameters, bare and coated.

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AMSCO No. 6 for combination of corrosion or abrasion, or for 1000° service and above. Used as facings for tool and die applications. No. 1 has greater abrasion resist-

This Wall Chart can save you money. Listing over 50 common hardfacing applications, it recommends the right AMSCO rod to use and the preferred method of application. Write for this free wall chart-guide today.

AMERICAN **Brake Shoe** COMPANY

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis.

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Manganese Steel Bars and Shapes

CONTROLS IMPACT and ABRASION

Through many years' experience in the production and application of manganese steel—"the toughest steel known"—AMSCO has developed welding products designed solely to conserve and protect parts exposed to impact and wear. American Brake Shoe Company's scientists and engineers are working continuously to build better defenses against wear in machines and equipment.

AMSCO Welding Rods are known for their excellent service in many applications—from rock crushers to materials handling pumps . . . in forging, rolling, stamping, and cutting . . . for gears, sprocket wheels and clutch cams . . . in grinding, mixing, and chipping operations . . . Whatever your problem of wear, there's a "proved-in-service" AMSCO Hardfacing Product that can solve it.

ance; No. 6 is the tougher, and can be machined. All diameters, bare and coated.

AMSCO No. 1 for combination of corrosion or abrasion, or for 1000° service and above. Used as facings for tool and die applications. No. 1 has greater abrasion resistance; No. 6 is the tougher, and can be machined. All diameters, bare and coated.

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AMSCO AIR-HARDENING for abrasion and severe impact. Deposit can be forged to a sharp edge without losing hardness. All diameters, bare and coated.

AMSCO HF-40 for severe abrasion and moderate impact. Deposits of HF-40 are hard and abrasion resistant. All diameters, coated only.

AMSCO HF-60 for moderate impact and severe abrasion. This rod is particularly suitable for application in both flat and vertical positions. All diameters, coated only.

AMSCO CO-MANG for build-up on manganese steel castings exposed to severe impact. Deposit has excellent impact resistance. All diameters, coated only.

AMSCO TOOLFACE for metal to metal wear up to 1000° F. Toolface deposits have excellent abrasion resistance. All diameters, bare and coated.

AMSCO DIEWELD for tools and dies. Deposit may be softened for machining and rehardened. Retains a keen cutting edge.

AMSCO V-MANG for build-up on manganese castings exposed to impact.

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In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

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with P&H ELECTRIC SHOVELS

In more and more locations these ultra-modern P&H machines are taking over the jobs that call for big production — steady digging. Users who know their cost accounting come back for more — for one proved reason . . . *lower tonnage costs.*

Contributing factors are these:

P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically, gives you snappier dipper action — eliminates hoist generator, slip friction clutch and other troublesome mechanical devices.

P&H stepless power regulation is smooth and accurate — with no control fingers or contactors to give you trouble.

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*T.M. of Harnischfeger Corporation for electro-magnetic type clutch

Every third P&H Electric Shovel sold is a repeat order

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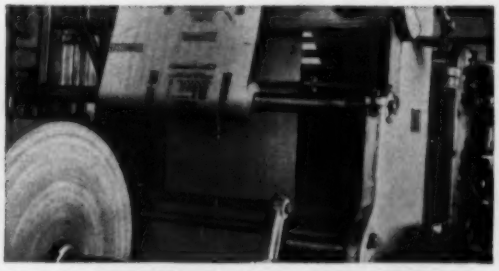

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Old Time Vertical Kiln...

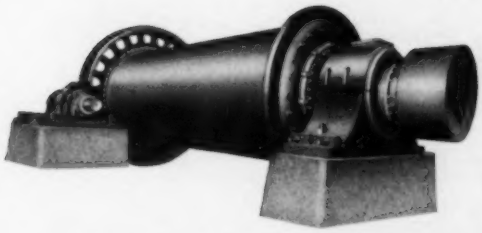
once newest and best, has taken its proper place in history. Demands for increased output of a more uniform product ushered in the modern rotary kiln. Foremost for efficiency are Traylor Kilns which feature easily adjustable supports and single section rigidity of all welded steel shells. These features permit perfect alignment . . . cut maintenance costs . . . reduce power requirements. You can depend on Traylor Rotary Kilns for each is "Traylored" for its particular job.

TRAYLOR IS . . . *celebrating its Golden Anniversary as a pioneer manufacturer of advanced machinery for the cement industry. During its 50 year history, Traylor equipment has gained a world-wide reputation for operating efficiency and dependability on the job.*

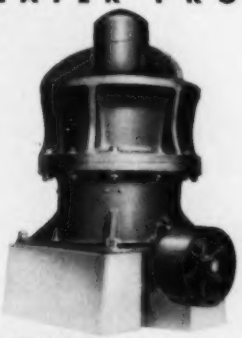
TRAYLOR DOES . . . *recognize the particular requirements of the cement industry. We have been able to develop advanced equipment to meet it's needs. Examine the construction details of Traylor machinery and you'll see the built-in values only Traylor's half-century of experience can provide.*

This Rotary Kiln, now operating in a Western cement plant, is one of several owned by the same company. One sure indication of the dependability of Traylor equipment is the number of customers who return to Traylor time after time for all types of Cement Plant machinery.

A TRAYLOR LEADS TO GREATER PROFITS

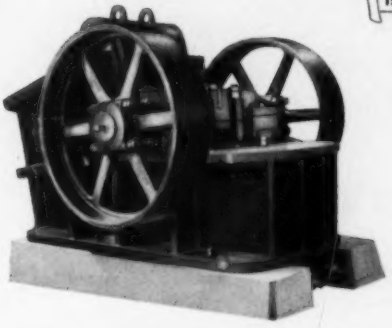


Traylor Grinding Mills are made in a wide variety of types and sizes to meet grinding requirements anywhere in the world. Check the following for your particular needs: Ball, Compartment, Rod and Tube Mills. For specific information about the Traylor Mill you need, state the approximate requirements of your job.

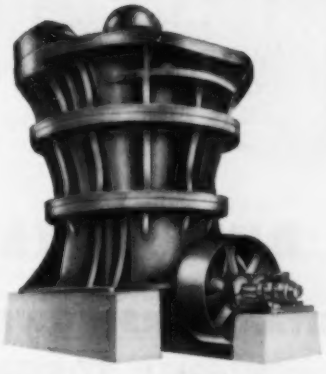


Traylor Type TY Reduction Crusher is noted for its simple, compact design . . . maximum strength and operating efficiency. Nonchokable, self-tightening Bell Head and Curved Concaves produce an exceptionally uniform product . . . fewer waste fines. Built in six sizes with feed openings from 3" to 22".

OUR GOLDEN ANNIVERSARY YEAR 1902 1952



Traylor Jaw Crushers are strongly built for heavy-duty primary breaking. They are made in five types with feed openings ranging from 8" x 12" up to 60" x 84". Each type employs Traylor's curved jaw plates for greater production and lower operating costs. Write for descriptive literature specifying size of product you require.



Traylor TC Gyratory Crushers are the most advanced primary crushers of their type. Extra capacity and efficiency is due to Traylor's original non-chokable, self-tightening bell head and curved concaves. They are made in seven sizes, with feed openings ranging from 20" to 60".

Write for Bulletin 7121 for complete information and specifications on all types of Traylor equipment.

Traylor Engineering & Manufacturing Company
1406 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco • Los Angeles
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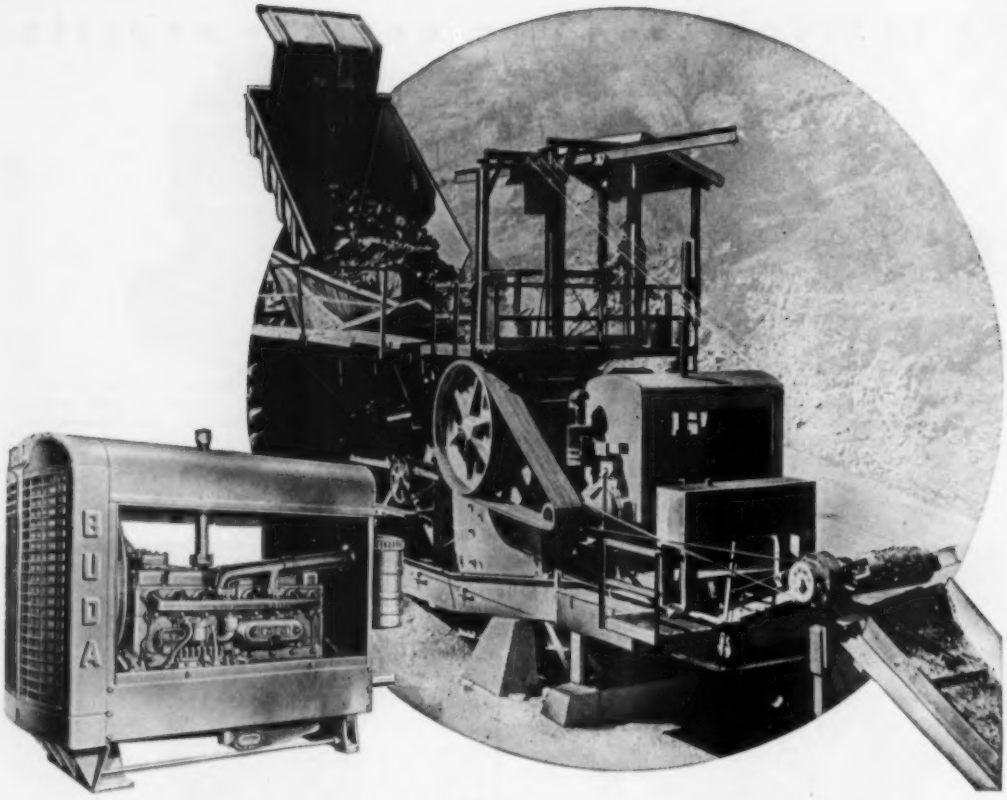
Traylor

CEMENT MACHINERY

Apron and Grizzley Feeders, Rotary Kilns, Coolers and Dryers
Jaw, Reduction and Gyratory Crushers
Grinding Mills • Crushing Rolls



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EXTRA HORSEPOWER 12 to 16% more displacement means more power—greater reserve for occasional overloads.

HIGHER TORQUE Buda Diesels have up to 14% higher torque at normal operating speeds—greater lugging ability in the *economical* operating range.

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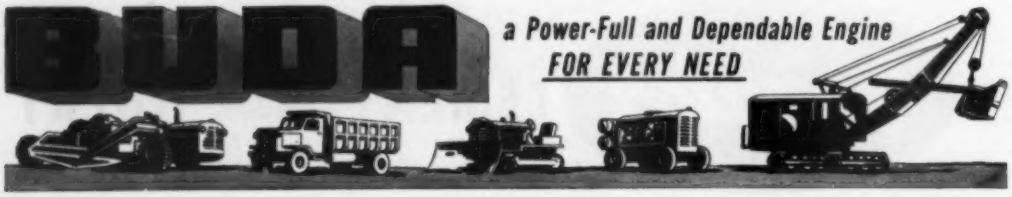
For more profitable operation of your crushers, trucks, shovels, dozers or scrapers, ask your Buda Engine Distributor for full details on Buda dyna-swirl Diesels today. Write for Bulletins and Specification data. The Buda Company, Harvey, Illinois.

BC-24

BUDA *a Power-Full and Dependable Engine* ***FOR EVERY NEED***



BETTER FRAGMENTATION

In shooting for pay loads, you will find that you can get better fragmentation if you

"Hook up and Detonate with PRIMACORD"

For two good reasons: 1) Primacord fires every cartridge in every hole with the added force of a primer cartridge. 2) By proper hook up the front row of holes will go a split second before succeeding rows, thus relieving burden and resulting in better fragmentation.

Wound on light weight spools, easily carried, Primacord is easy to handle on the job. Use it for trunk line hook ups and down hole branch lines. It fires instantaneously from a blasting cap yet cannot be set off by friction, sparks, ordinary shock or stray currents.

To keep those trucks rolling keep PRIMACORD unrolling

Ask your explosives supplier or write us direct for further facts. The Ensign-Bickford Company, Simsbury, Connecticut.

Also Safety Fuse since 1836

There's a type for every job. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep holes and unusual wet conditions.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

CONTROLLED IMPACT ACTION PAYS OFF for GALLAGHER & NELSON at MADISON, WISCONSIN

SINGLE 3240 PMCO IMPACT MASTER DOES COMPLETE CRUSHING JOB IN MODERN CLOSED CIRCUIT SETUP

Pays off with lower plant investment. High ratio of reduction eliminates secondary crushers and auxiliary equipment.

Pays off with better quality cubical product. Breaking is accomplished by rigidly mounted rotor hammers producing a high quality cubical aggregate.

Pays off with greater control over finished product size. Simple machine adjustments change the percentage of sizes in the finished product.

Pays off in less horsepower per ton. Average production of 150 tph. 2½" minus using less than 1 h.p. per ton. Peak production potential of 250 tph.

Portable 3240 Impact Master with 36" x 12' apron feeder, 30" delivery conveyor, Murphy ME6 power, 30" plant conveyor, 5' x 14' 3 deck vibrating screen, 18" return conveyor.

You can depend on Controlled Impact Action to PAY OFF for you. PMCO Impact Masters are built with capacities to 500 tph. Write today for job-proved facts on the size that meets your requirements. PMCO Impact Master Division, Universal Engineering Corporation, Cedar Rapids, Iowa.

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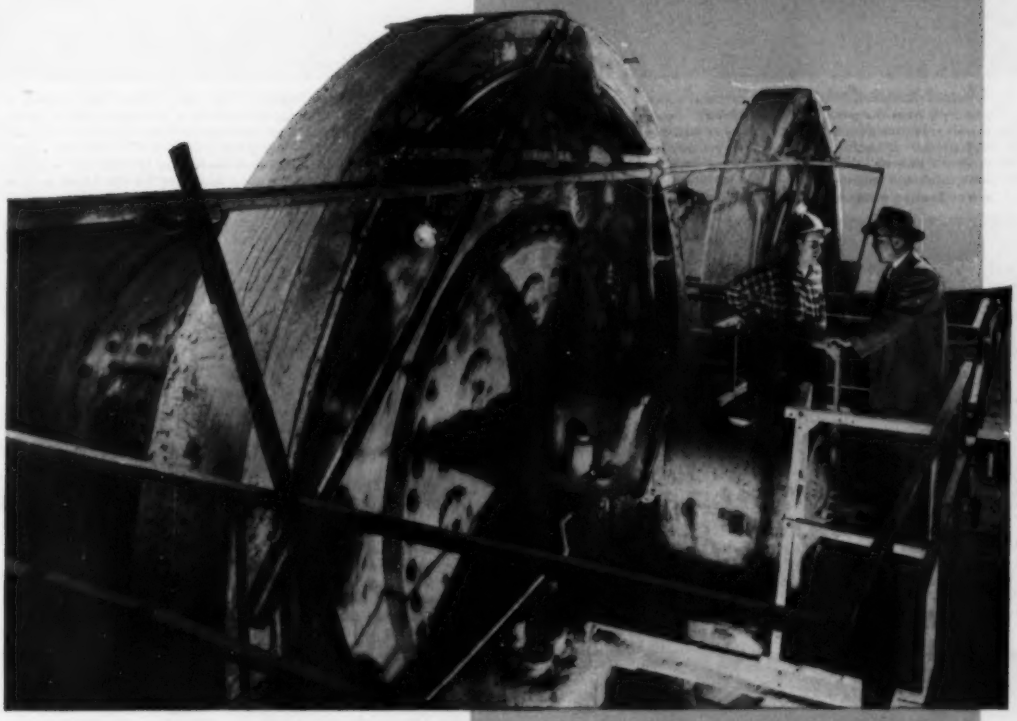
Ball and rod mill bearings stay COOLER with GULF BLOCK GREASE



Gulf Block Grease can help you increase open-top bearing life and reduce maintenance costs. It's equally effective for cement-kiln, crusher, and pulverizer bearings. Ask a Gulf Lubrication Engineer for complete details. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Pittsburgh 30, Pennsylvania.

5 reasons why:

1 constant melting rate
2 nonglazing
3 effective up to 285°F.
4 excellent oiliness characteristics
5 clean-noncarburizing

GULF INDUSTRIAL LUBRICATION

Increase PRODUCTION . . .

1 ***Haul anywhere*** . . . Tournarocker is a new kind of haul unit built from the ground up for "off-road" hauling. It safely travels mountain trails and cross-country as well as highways and city streets. It hauls capacity loads over any kind of terrain. And, it stands up to tough, rough hauling work on steep grades with minimum maintenance. Optional Electrotarder provides added braking action for safety on steep grades.

2 ***Speed loading*** . . . Big, wide "target" areas make it easy for shovel or dragline operators to get faster loading cycles with Tournarockers. Body opening on 9-ton size is 7′ x 11′, on 18-ton is 9½′ x 12½′, on 35-ton is 10′2″ x 17′2″. Width is most important because radial distance is hard for operator to judge. Rear of body provides a wide, low entry for the dipper to give extra speed advantage for the excavator.

Dumping sandstone near New Haven, Conn.

Construction at Wash.

5 ***Reduce time dumping*** . . . a touch of electric switch on operator's panel activates hoist motor . . . means a fast, safe dump. Independent brakes on front and rear allow operator to safely back to edge of fill . . . lock rear wheels and dump over edge . . . yet keep prime mover in forward gear for safety and fast getaway. There is no delay for hydraulic pressure to build up, no slow jacking up by hydraulic pumps. Loads fall free and FAST!

6 ***Clean load every time*** . . . even in mud and sticky clay, Tournarocker dumps clean. The streamlined body sheds material readily . . . body can be raised to vertical position to clear load . . . no material rides back to the excavator to steal pay-load room on next trip. Large boulders or oversize rock easily clear and can safely be dumped over edge of fill. Rocks cannot roll forward against wheels nor can material pile under rear end.

Stripping quarry rock near Phoenix, Ariz.

Stripping coal mine at Mt. Carmel, Pa.

9 ***Cut maintenance troubles*** . . . because Tournarocker has no hydraulic lift complications, no high pressure jack lines to keep tight, no long drive-shafts to rear-wheel drive, the most common maintenance problems of rear-dump haul units are eliminated. Owners in all parts of the world are reporting exceptionally high mechanical efficiency and low maintenance costs handling heavy rock and ore with Tournarockers.

10 ***Improved safety*** . . . low center of gravity, good clearances, high visibility, front-wheel drive, 90° power steer, giant tires, big 4-wheel air brakes, push-button electric control, big comfortable air foam cushion seat, high maneuverability . . . all these features combine to make this rear-dump haulor an important asset for safety. This permits fast hauling, saves time on dump, and makes it easier to train new operators.

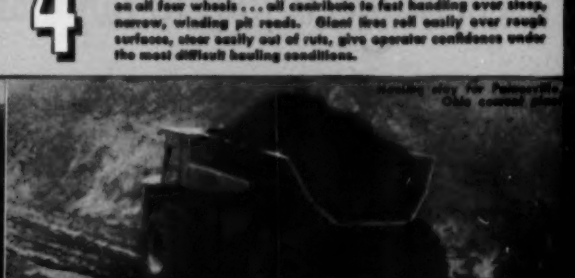
LETOURNEAU PEORIA, ILLINOIS *TOURNAROCKERS*

TRACTION ADVANTAGES of A CRAWLER PLUS HIGH-SPEED on RUBBER

Simplify JOB MANAGEMENT

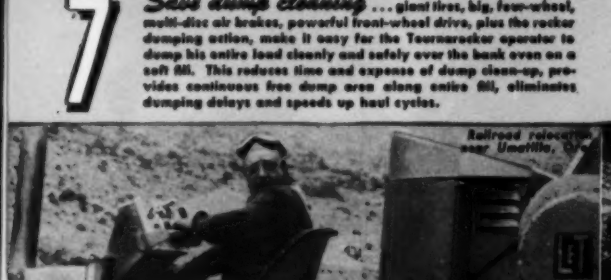
3 ***Cut spotting delays*** . . . You need fewer "spots" with these BIG haul units, and, because of their big tops, it is easier and quicker to put them under the dipper. The prime mover can pivot at right angles to the body providing a 90° angle for prime mover wheels. That saves time at every spot. Operator can back in fast because he has positive power steer and can stop instantly with air-operated multi-disc air brakes.

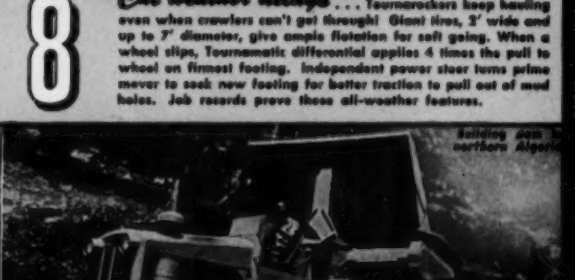
4 ***Work fast in tight quarters*** . . . positive power steer, 90° turns, electric controls, multi-disc air brakes that have more braking surface on a single wheel than most haul units have on all four wheels . . . all contribute to fast handling over steep, narrow, winding pit roads. Giant tires roll easily over rough surfaces, steer easily out of ruts, give operator confidence under the most difficult hauling conditions.



7 ***Save dump cleaning*** . . . giant tires, big, few-wheel, multi-disc air brakes, powerful front-wheel drive, plus the rocker dumping action, make it easy for the Tournarocker operator to dump his entire load cleanly and safely over the bank even on a soft fill. This reduces time and expense of dump clean-up, provides continuous free dump area along entire fill, eliminates dumping delays and speeds up haul cycles.

8 ***Cut weather delays*** . . . Tournarockers keep hauling even when crawlers can't get through! Giant tires, 3' wide and up to 7' diameter, give ample flotation for soft going. When a wheel slips, Tournamatic differential applies 4 times the pull to wheel on firmest footing. Independent power steer turns prime mover to seek new footing for better traction to pull out of mud holes. Job records prove these all-weather features.





11 ***Operator comfort*** . . . from an employee relationship standpoint, as well as safety, Tournarocker is an asset to your organization. The big air foam cushion seat eliminates "bounce" . . . no "up and down" ride on these Tournarockers. Pushbuttons on the instrument panel actuate electric motors that eliminate all manual work of steering. Fatigue factors are greatly reduced on Tournarockers. This means increased production for you.

12 ***Insure future earnings*** . . . Behind the Tournarocker prime mover, you easily interchange Carryall scrapers, bottom-dump haulers, cranes, flat-bed trailers. This gives you a plus in insurance of steady earnings in any season and any time. And, any additional trailing unit is available anytime at only approximately 25% of the initial cost! Bulldozer blade or snow plow can also be added on the small "D" for extra profit.

Mail today to: R. G. LeTOURNEAU, INC., Peoria, Illinois

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COMPANY.....

STREET.....

CITY..... STATE.....

Type of work.....

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- ☐ Have Distributor call regarding:
- ☐ 9-ton, 28 m.p.h. Tournarocker
- ☐ 18-ton, 35 m.p.h. Tournarocker
- ☐ 25-ton or 50-ton Tournarocker

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for Better Bags...Better Buy Chase

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BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MEMPHIS • BUFFALO • ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE
PITTSBURGH • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • GOSHEN, IND. • PHILADELPHIA • NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY
OKLAHOMA CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS • CHAGRIN FALLS, O. • WORCESTER, MASS. • CROSSETT, ARK. • SAN FRANCISCO

only Allis-Chalmers offers

HISTORY-MAKING

Tracto-Shovel Advantages

now in 3* new, BIGGER SIZES . . .

1-YD. HD-5G
2-YD. HD-9G
*3-YD. HD-15G
*4-YD. HD-20G

Thousands of Allis-Chalmers HD-5G 1-yd. front-end shovels are making history . . . handling an endless variety of excavating and material handling jobs faster, at lower cost than ever before.

Now . . . to meet the challenge of ever-increasing production demands, Allis-Chalmers *multiplies the scope of tractor usefulness even more.* And here's how. The same basic design — the same versatility that made the HD-5G so useful can now be yours in the 2-yd., 3-yd., and 4-yd. Tracto-Shovels. Combined with the unmatched performance of the new Allis-Chalmers tractors, they give you a real competitive advantage by bringing you a new, faster and better way of getting the job done.

A NEW ERA OF TRACTOR USEFULNESS

Pioneering New Methods — Tracto-Shovels are blazing new trails in excavating and material handling . . . doing traditional jobs in a new, better way.

A Size for Every Job — Faster, more efficient operation at lower investment.

All-'Round Versatility — Not limited to a specific type of operation. Fourteen quickly interchangeable attachments adapt Tracto-Shovels to different assignments *in minutes.* Simple truck or trailer transportation between jobs.

Built to Take It — These new Tracto-Shovels are the toughest, strongest ever built. Every part has ample size and strength to do its job.

World's Largest Front-End Shovel

— handles toughest excavating and material handling jobs in a new, faster, better way. Standard bucket capacity — 4-yd.; light-materials capacity — 7-yd.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

— the newest, finest line on Earth!

"Better in every way"

Says Frank Casilio about new pre-mix setup with Worthington Big Mixer

FRANK CASILIO, President of Frank Casilio and Sons, Bethlehem, Pa., ready-mix concrete producers, Fernando Casilio, Plant Manager, Joanne Casilio, Business Manager.

Output is *up* 35%, hauling time, truck maintenance and fuel consumption are down, at new Bethlehem, Pa., plant of Frank Casilio and Sons.

According to Frank Casilio, President of this ready-mix company, they *had* to modernize plant facilities to keep up with a constantly increasing business. So in 1949 the Casilio Company set to work to replace their existing transit-mix setup so as to increase output without sacrificing a reputation of unexcelled quality.

The resulting pre-mix installation—a model of efficiency—was achieved with the help of batching specialists and Worthington engineers. New facilities include a 2 yd Worthington Big Mixer, a fully automatic Worthington Water System, and 15 Worthington Hi-Up Truck Mixers.

Write for further data on Worthington Big Mixers and other Blue Brutes that can boost your plant's output and efficiency. Worthington Corporation, Construction Equipment Division, Plainfield, New Jersey.

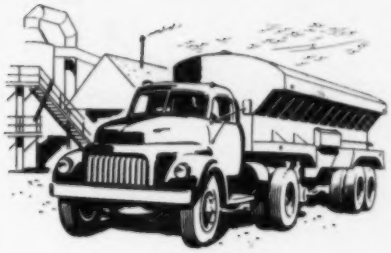
"A MODEL OF COMPACTNESS AND EFFICIENCY." That's what construction people call this modern Casilio pre-mix plant at Bethlehem, Pa. All controls are situated within a 6-foot radius including those for the Worthington Big Mixer which charges or discharges in 12 seconds. Production's up over 30% with same haulage units—15 Hi-Up Truck Mixers like one in foreground.

If It's A Construction Job, It's A *Blue Brute* Job

WORTHINGTON

Construction Equipment

Eaton 2-Speeds let truck engines "take it easy"

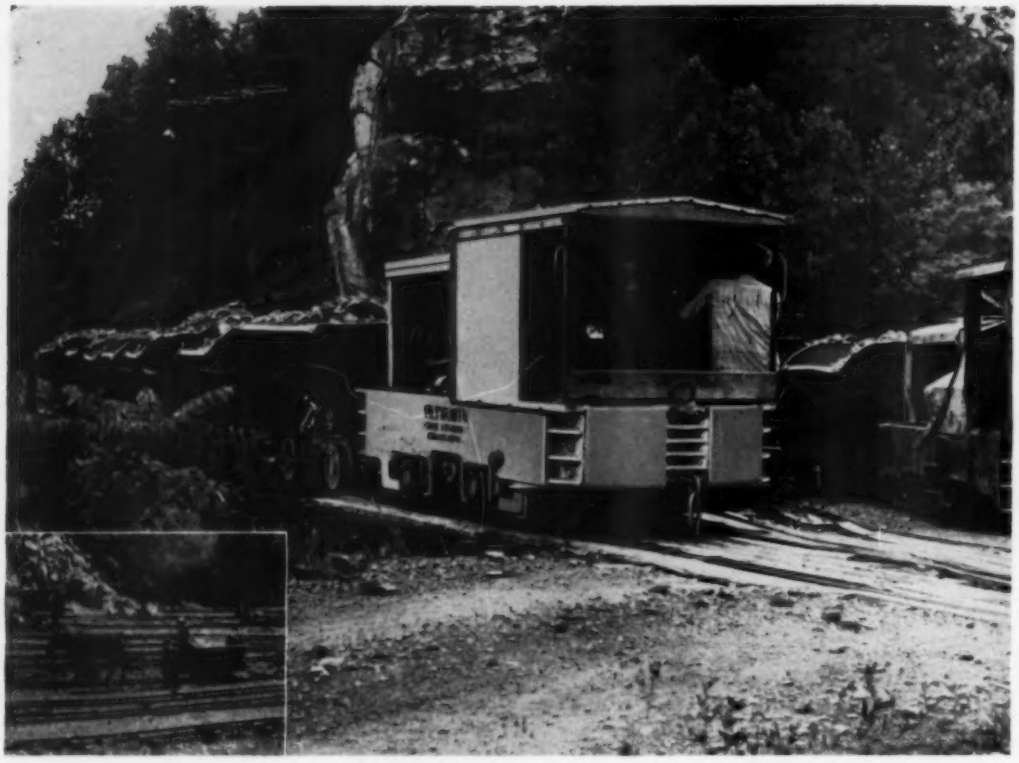


OFF-THE-HIGHWAY in the toughest kind of going, or making time on the open road, Eaton 2-Speed Axles give truck engines a chance to work in their most efficient and economical speed range. By providing double the conventional number of gear ratios, Eaton 2-Speeds let drivers select the right ratio for every road and load. Stress and wear are reduced not only on engines, but on all power transmitting parts. Eaton-equipped trucks work harder, last longer, cost less to operate and maintain—are worth more on the trade in. Let your truck dealer explain how Eaton's exclusive planetary gearing, forced-flow lubricating system, and other features keep Eaton 2-Speeds on the job, at minimum cost.

EATON *2-Speed Truck* AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



WE'VE BEEN SAVING EVER SINCE

Riverton Lime and Stone Company, Inc., Riverton, Va., like many other firms, learned long ago that investing in Plymouth Locomotives is the best way to save money on haulage costs.

"Over 24 years ago we replaced mule-power with a 3½-ton Plymouth. The purchase of a 7-ton Plymouth followed shortly and we have added two more since. We have been realizing very definite savings ever since we started using Plymouth Locomotives," states H. W. Smith, Vice-President in Charge of Operations.

Riverton's first Plymouth, like the others, works up to 46 hours per week. On each trip it pushes 10 cars of stone up 3½% grades. From the first, it has delivered dependable, economical service with a minimum of maintenance!

The time-defying construction of Plymouth Locomotives is providing dependable service and economical operation and maintenance on all kinds of tough hauling jobs. Gasoline or Diesel-mechanical, Diesel-electric, and gasoline or Diesel-hydraulic power available on models for standard or narrow gauge track. Sizes from 3 to 70 tons.

What are your requirements? Write for the new Plymouth catalog. PLYMOUTH LOCOMOTIVE WORKS, Division of The Fate-Root-Heath Company, Dept. A-15, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

Also manufacturers of F-R-H ceramic machinery

PROGRESS IN EXPLOSIVES . . .

EXPLOSIVES PARADOX

Don't be misled by the "old style" mule. This is a scene at an up-to-date dynamite plant. "New style" is the modern air conditioning equipment shown in the background.

Air conditioning enables Hercules to control atmospheric conditions while the dynamite is being packaged behind the barricade. In other words, it keeps your powder dry.

This is another example of Hercules pioneering that gives you better made explosives with better blasting efficiency.

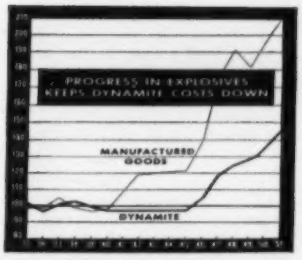


Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods. 1935-39 value = 100.

HERCULES POWDER COMPANY

INCORPORATED

Explosives Department, 960 King St., Wilmington 99, Del.

XR52-5

for clean aggregate high capacity

Three of the five 60-inch diameter Telsmith Super-Scrubbers in Colonial Sand & Stone Co., Inc. plant, Port Washington, N. Y.

Most of the better sand and gravel pits are exhausted—those now being opened up contain more clay and extraneous matter which must be eliminated. Many states now require that all crushed stone be thoroughly scrubbed before screening to eliminate soft stone, clay and dirt. This has created a demand for a better scrubber—one which will eliminate large amounts of clay with a minimum of expense for installation, water, power, and up-keep. Telsmith's answer to this problem is the Super-Scrubber—proven successful in many of the toughest pits and quarries.

The outstanding features of the Super-Scrubber are its high speed, terrific impact and grinding action—very much like that of a ball mill. Aggregate travels from feed to discharge end against clean water flowing in the opposite direction—emerges clean—with clay and dirt disintegrated and carried away by the water. Best results with maximum scrubbing efficiency on coarse aggregate are obtained with the sand removed.

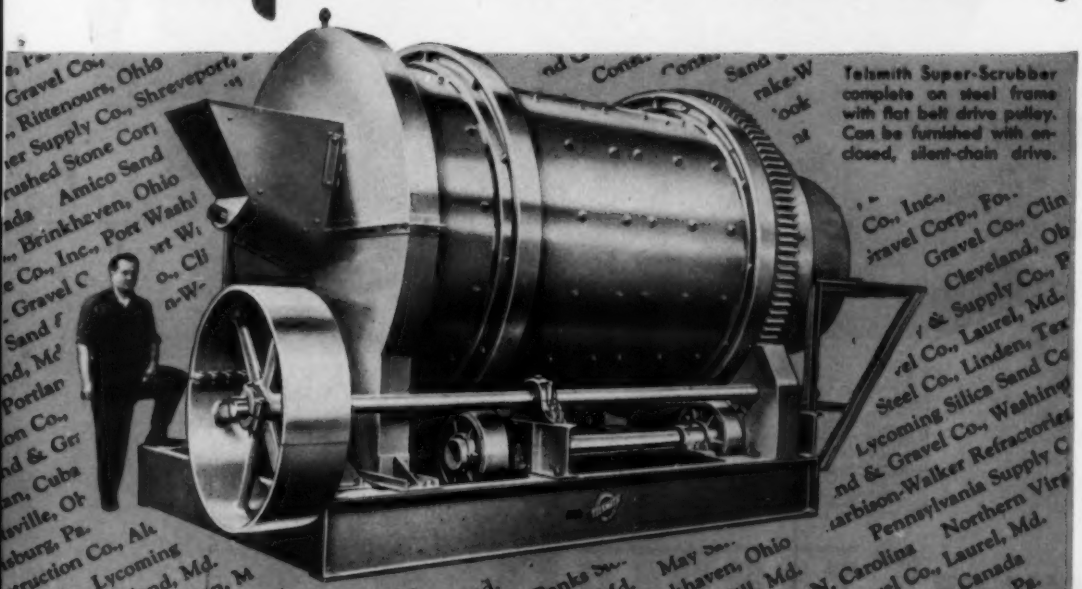
Telsmith Super-Scrubbers are designed and built to carry a heavy load of aggregate and give years of service with a minimum of up-keep expense. Four sizes: 60-inch to 96-inch diameter—capacities, 50 to 250 tons per hour. Send for Bulletin 266.

55-1

S. MITH ENGINEERING WORKS
504 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

TELSMITH

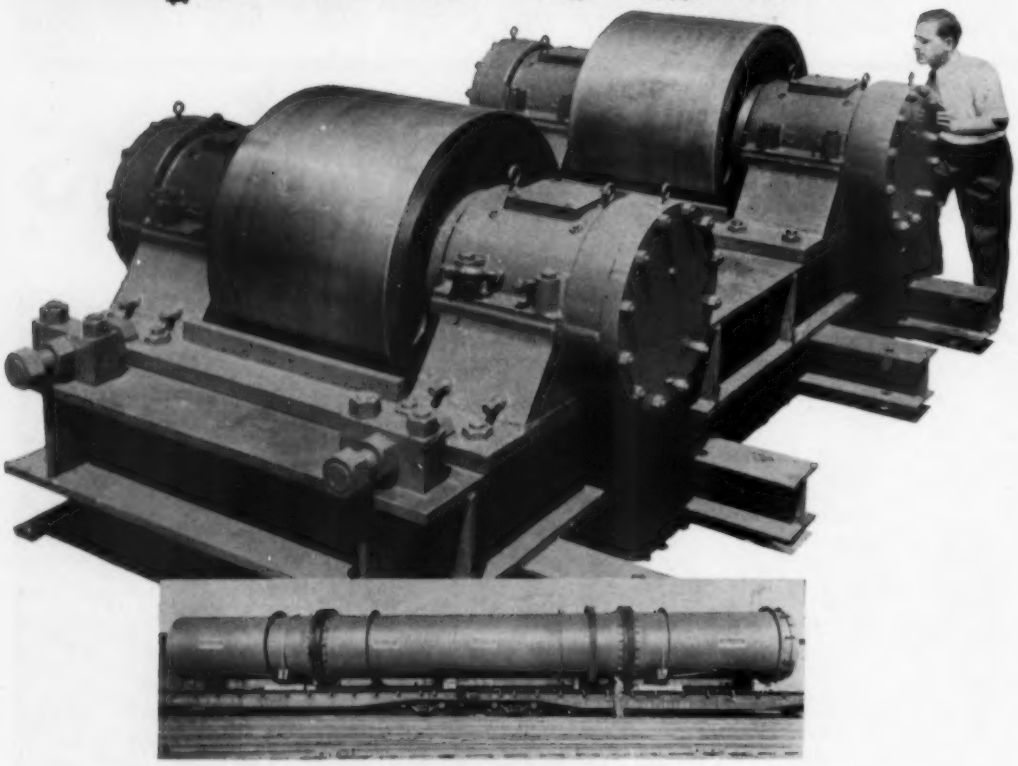
Super-Scrubbers®



Telsmith Super-Scrubber complete on steel frame with flat belt drive pulley. Can be furnished with enclosed, silent-chain drive.

Gravel Co., Rittenours, Ohio
Supply Co., Shreveport,
Stone Co.
Amico Sand
Brinkhaven, Ohio
Co., Inc., Port Wash
Gravel C
Sand
Portlan
Co.,
Cuba
Ohio Lycoming
Gravel Co., Fairland, Md.
Construction Co., Clinton, M
New Enterprise, Pa. Buffalo Sand & Gravel
Laurel, Md. May Sand & Gravel Corp., Fort Wayne, Ind.
Linden, Texas Amico Sand & Gravel Corp., Portland, Ore.
Banks Stone & Sand Co., Montoursville, Pa. Davis Sand & Gravel Co., Clinton, Md. Banks Sa
Valley Mould & Iron Co., Washington, D. C. Kilbuck Sand & Gravel Co., Brinkhaven, Ohio May Sa
Dutchess Quarry & Supply Co., Kingston, Pa. Silverhill Sand & Gravel Co., Silver Hill, Md.
Harbison-Walker Refractories, Cleveland, Ohio Grove Stone & Sand Co., Swannonoa, N. Carolina
Pennsylvania Supply Co., Poughkeepsie, N. Y. Prince George Sand & Gravel Co., Laurel, Md.
Northern Virginia Construction Co., Garrettsville, Ohio J. Cooke, Ltd., Aldershot, Ont., Canada
Sharon Silica Co., Harrisburg, Pa. Fiala Crushed Stone Corp., Annville, Pa.
Contee Sand & Gravel Co., Jackson, Ohio Alexandria, Va. Banks Stone & Sand Co., Ki
Colonial Sand & Stone Co., Alexandria, Va. Meriwether Supply Co., Shreveport, La.
Fenton Construction Co., Fairland, Md. New Enterprise Stone
Buffalo Sand & Gravel Co., Inc., Port Washington, N. Y.
Miami Gravel Co., Ashland, Ohio Grove
Drake-Winkelman, Cuba Silver Hill, Md.
Kilbuck Sand & Gravel Co., Rittenours, Ohio
Colonial Sand
May

NEED 'EM RUGGED?



CALL ON STANDARD

Take a look at the ruggedness of the trunnion assembly pictured in the top photograph. These are trunnions for a 10 ft. diameter by 150 ft. long *STANDARD* kiln, just completed. Another *STANDARD* kiln mounted on flat cars, ready for shipment, is shown in the inset photograph. Both illustrations tell more graphically than words why *STANDARD* so often gets the CALL when the need is for rugged dependability. There's nothing skimpy about *STANDARD* Rotary Equipment. It is built *to last*, like the Company behind it. Now celebrating our 50th year of heavy engineering progress. WRITE TODAY FOR FULL DESCRIPTIVE LITERATURE

Rotary KILNS
COOLERS
CALCINERS
DRYERS
ANY size ANYwhere

STANDARD 50 YEARS 1902 1952 STEEL CORPORATION

STANDARD

STANDARD STEEL CORPORATION

5006 Boyle Ave., Los Angeles 58 ★ 419-6 Commonwealth Ave., Boston 15

Practical Assistance

Whether it's burrs in a dog's coat, or *lubrication snarls* in a quarry operation . . . there's no substitute for practical assistance when the going really gets rough.

And ***PRACTICAL TECHNICAL ASSISTANCE*** is a Cities Service specialty.

Cities Service Lubrication Engineers can offer every quarry operation practical assistance that will mean dollars, man-hours and equipment saved. These men are specialists in the industry's most effective lubricating practices. In addition, they offer the most complete line of quality lubricants.

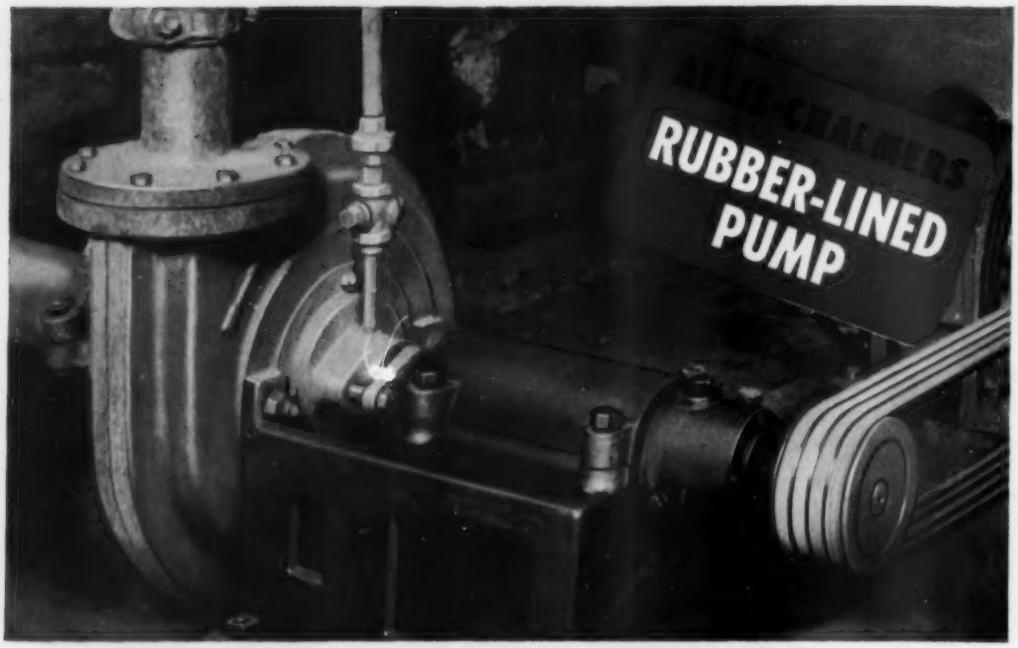
BUT CHECK FOR YOURSELF:

✓ Check on the high quality of all Cities Service lubricants. Check critical users, or, better still, test them on the job.

✓ Check the *complete* Cities Service line as an aid to simplified ordering and prompt, steady supply. Deliveries are quick, accurate and dependable.

✓ And finally, discuss your problems with a Cities Service Lubrication Engineer . . . he's probably solved many like them for other quarry operations. Write or phone CITIES SERVICE OIL COMPANY, Dept. G21, Sixty Wall Tower, New York City 5 . . . or get in touch with the office nearest you.

CITIES SERVICE



UP TO 50 Times Longer Life

HANDLING FINE MESH MATERIALS

PERFORMANCE RECORDS FROM FIFTEEN YEARS of handling all types of slimes, slurries and other fine mesh abrasive suspensions show definite savings from the use of Allis-Chalmers type SRL Rubber-Lined Pumps. Instances of 10 to 50 times the life of the finest alloy pumps built for this service are not uncommon. Not only are pumping costs reduced, but production lost from shutdowns is almost eliminated and standbys often can be done away with.

Unique Lining Method

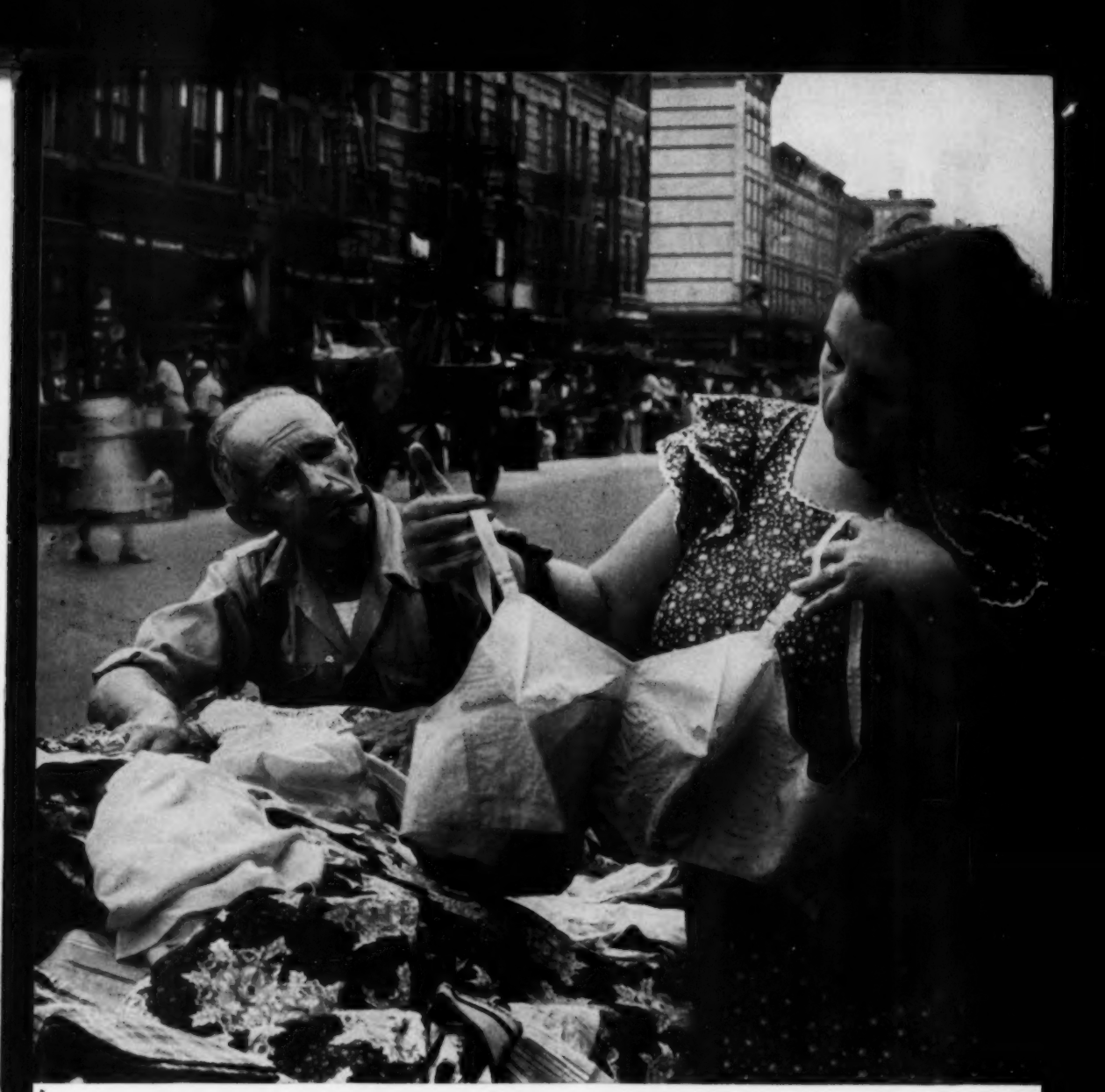
The rubber lining of the Allis-Chalmers SRL Pump is bonded to a heavy steel skeleton which is simply fitted into the casing. The lining and the casing are not bonded together. When the lining finally must be renewed, the pump need not be dismantled and removed from its location. Replacement cost is kept to a minimum.

Each Installation Specially Engineered

Every pump is individually engineered to provide the best possible performance for the application involved. Special rubber linings of various compounds are available to handle a variety of slurries at low per-gallon pumping cost.

If you are handling sand, taconite, grinding mill discharge, tailings or any other abrasive slime or slurry, ask your Allis-Chalmers representative to show you how you can get long pump life and low cost per gallon pumped. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, and ask for Bulletin 08B7311. A-3698

ALLIS-CHALMERS



"and from the best makers, lady!"

These are well made and give dependable service, the sidewalk merchant implies. Was there ever an eager salesman who didn't!

To the men who order more than 85 per cent of all Multiwall bags, reliability of manufacturer is one of the most important considerations*.

But it must be a *proved* reliability.

Union reliability has been demonstrated by 76 years of unbroken leadership in paper packaging. Union's mammoth Savannah plant, world's largest integrated pulp-to-container mill, produces Multiwalls by the million.

Capacity and fair treatment are among the many good reasons why, with a free choice of all Multiwall manufacturers, major buyers are specifying UNION Multiwalls to a greater extent than ever before.

More so every day . . .

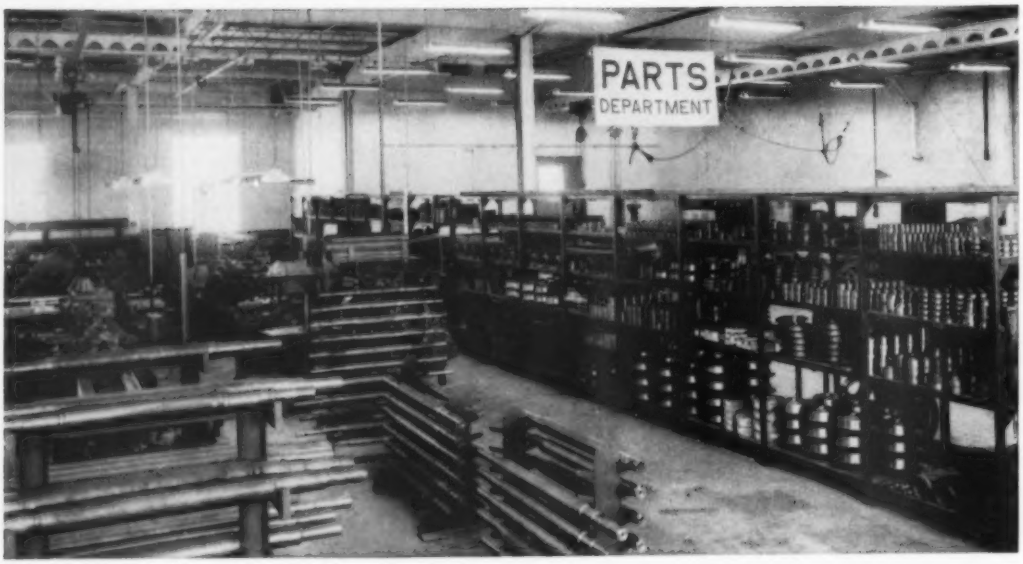
IT'S UNION FOR MULTIWALLS

*August, 1951 research study.

UNION BAG & PAPER CORPORATION • WOOLWORTH BUILDING, NEW YORK 7

This Department Is Never Busy

...but SECO VIBRATING SCREENS ARE



Long Life Performance Means Profitable Screening for SECO Users

If you have Seco vibrating screens on your job . . . it's good to know that you can get *quick service* on any parts replacements you may ever require. That's part of Seco's service policy . . . another of the reasons why you put your confidence in the Seco organization.

BUT HERE'S SOMETHING MORE IMPORTANT!

Seco vibrating screens *are built to endure.* The smooth, balanced performance of patented Seco vibrating screens pays off in long life . . . and a holiday from excessive maintenance worries. *It's a proven fact!* Thousands of busy Seco vibrating screens can't keep our parts department busy.

SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

WHAT'S AHEAD?
Check your screening requirements now.
PLAY SAFE! REPLACE OR ENLARGE WITH
Performance-Proven
SECO VIBRATING SCREENS
made only by
SCREEN EQUIPMENT CO., INC.
1750 Walden Avenue
Buffalo 25, New York
In Canada: United Steel Corp.
Toronto, Ontario

NOW all the HOT PATCH material you want..any type..any quantity where and when you want it

for ALL maintenance and small paving jobs

the NEED

In the face of ever heavier traffic loads, rising costs and lack of funds greatly limit new construction and place an ever greater burden on maintenance programs in city, town, county and state. For this work even the best patch is none too good. Yet until the advent of the new Mixall, an efficient and economical means of producing all types of hot high quality patch material has not been available.

is ANSWERED

A small, highly portable unit, capable of on-the-spot production of even the highest types of hot mixes comparable to those produced in Barber-Greene's largest continuous hot mix plant—*that* is the Mixall. Its range of usefulness extends throughout the field of road maintenance into small paving and resurfacing jobs.

In the Mixall, Barber-Greene offers a unique and effective combination of an efficient rotary drum aggregate dryer with a proved B-G twin shaft heated pugmill mixer. It is rightly called the Mixall because of *all* the things it can do . . .

- . . . **Mix all quantities:** from a single 300 lb. batch up to 5 tons per hour of hot mix—or up to 10 tons per hour of cold patch.
- . . . **Mix in all locations:** towed to the job by truck loaded with aggregate . . . fed directly from truck or from stock pile or pit. Can work in a single traffic lane. No set-up time required.
- . . . **Mix in all weather:** heated aggregate makes low atmospheric temperature mixing possible — allows quick repair to prevent major failures.
- . . . **Mix all types:** of bituminous materials including stabilized mixes—as well as low slump Portland cement mixes.

BARBER-GREENE COMPANY, AURORA, ILLINOIS, U.S.A.

Barber-Greene

Send me the descriptive 8-page bulletin on the Mixall.

Name .....

Firm Name .....

Address .....

City ..... State .....

Look what you can do

Soak it in Acid Water

It won't penetrate the live Neoprene cover. This jacket does more than keep water out; it will not swell and deteriorate when exposed to oil and grease.

Drag it over rock–

The tough cover will take abuse like an elephant's hide. Amerclad cables are famous for their abrasion resistance. They can be dragged over sharp rock and rough floors without damage.

Flex it–

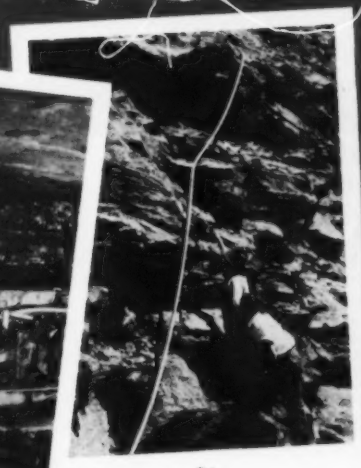
Amerclad Welding cables are made from extra-fine strands to eliminate strain on the operator's wrists. This also allows the cable to be easily snaked into restricted quarters.

AMERICAN STEEL & WIRE DIVISION
USS TRADE MARKS
AMERICAN ELECTRICAL WIRE AND CABLE
UNITED STATES STEEL

with AMERCLAD:

Reel it in or out–

Mine operators like the way Amerclad stands up under the continuous reeling necessary on so many mine machines. Here, the cable is reeled in and out—all day long—on a minimum diameter pulley.



Expose it to sunshine–

Amerclad cables are designed to give top service even when exposed to sunshine, ozone, oil or grease. This chemical protection, combined with the mechanical strength of Amerclad, assures you of long life even under the most punishing conditions.

Hang it over cliffs–

Amerclad has the strength to resist abrasion. Even though it sways in the wind and grinds against rock particles, the tough Neoprene jacket will bounce back for more.

WRITE FOR INFORMATION. There is an Amerclad cable or cord to meet your exact needs. Amerclad cables are designed for specific uses on portable machinery, tools, motor and generator leads, welders, machine tools, appliances, mining machinery—wherever you need a heavy-duty cable that will give long life and freedom from trouble.

Get in touch with your nearest A S & W office or write: American Steel & Wire Division, Rockefeller Building, Cleveland 13, O.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S American Electrical Wire and Cable

UNITED STATES STEEL

WHO ELSE GIVES YOU THIS MUCH PROTECTION?

WINSLOW ENGINEERING COMPANY • WINSLOW ENGINEERING COMPANY

WARRANTY

ONE YEAR REPLACEMENT CONTRACT

All products manufactured by Winslow Engineering Company are warranted to be free from any defects in workmanship and material. If, within one year from date of original purchase for installation, any unit or part of any of these products is found after inspection at the Winslow factory to be defective, it will be replaced free of charge if returned to the manufacturer, Winslow Engineering Company, Oakland, California, charges prepaid. No guarantee for element life in service is implied by this warranty.

Guaranty

Winslow products, when used as necessories, are further guaranteed not to harm in any way any equipment to which their use has been specified by Winslow engineers, providing the products are installed and used in accordance with specifications and instructions issued by Winslow Engineering Company.

Winslow Engineering Company neither assumes nor authorizes any other person to assume for it any further liability than expressly stated in this warranty.

Chas. A. Winslow
President

WINSLOW ENGINEERING COMPANY

4069 Ho[illegible] · Oakland 8, California

Winslow guarantees both the quality of its filters and elements and the safety of your equipment when these products are used on it. When you buy Winslow, you buy peace of mind. Enjoy this added value!

WINSLOW FILTERS

Winslow Engineering Company 4069 Hollis Street • Oakland 8, California

Top efficiency demands "total engineering" of screw conveyors

LINK-BELT integrates all components to give you the right screw conveyor for your job

Whether your screw conveying problem is feeding, mixing, blending, spreading, conveying, distributing or elevating, you'll find the right answer at Link-Belt.

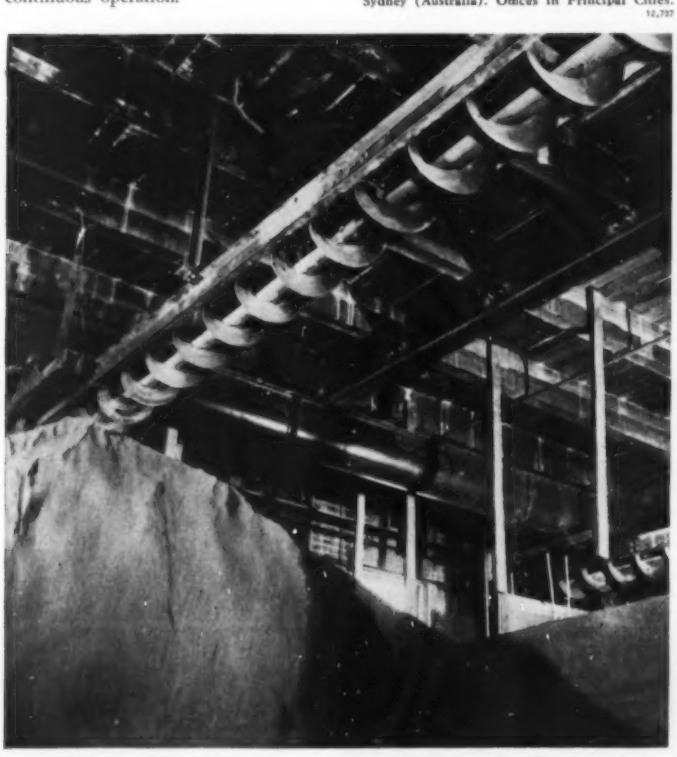
For Link-Belt Screw Conveyors are "totally engineered." That means every component is matched to the exact requirements of your job. And Link-Belt Screw Conveyors are accurately made to assure easy assembly, smooth and continuous operation.

Your Link-Belt representative can give you full information on the extensive line of Link-Belt Screw Conveyor components. Compare this complete choice of quality products with any other . . . and you'll choose Link-Belt every time.

LINK-BELT

SCREW CONVEYORS

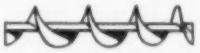
LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities.
52,737



Part of a Link-Belt Screw Conveyor system with open bottom cross conveyors for delivering powdered raw materials from railroad cars to any of 14 bins. The bed of material itself forms the surface over which additional material travels.

LINK-BELT designs and builds all components

SCREWS—L-B conveyor screws cover the complete field of material characteristics: Helicoid or Sectional for general application; Cut Flight for moderate mixing; Cut Flight with Paddles for added agitation of mixing; with Intermediate Paddles for moderate aeration or stirring; short pitch for inclined conveyors; ribbon flight for sticky, gummy or viscous materials; paddle type for blending dry or fluid materials; stainless steel for corrosion or heat-resistance or sanitation.



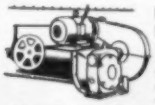
HANGERS—L-B hangers—available in a variety of styles and metals—provide a wide variety of mounting, bearing and cover arrangements and are designed for various volume requirements.

TROUGHS—L-B builds flanged, angle flanged, flared, rectangular, dust-seal, jacketed and drop-bottom types in any metal. Variety of connections, supports, covers and clamps offers added design flexibility.

SPOUTS & GATES—Spouts can be of the plain discharge opening, fixed discharge or detachable discharge types. Slide gates can be hand or rack-and-pinion operated.

SHAFTS & COUPLINGS—Conveyor drive and end shafts have closely controlled tolerances for correct bearing clearance. Couplings can be of the split flight type to facilitate installation where space is limited.

TROUGH ENDS—Steel plate, cast iron or stainless ends match all trough shapes, provide required shaft bearing support and alignment. Can have seal glands to protect bearings.



DRIVES—Link-Belt engineers many forms of drives to suit specific conditions—worm gear, Electrofluid, P.I.V. variable speed, and chain drives of various types.

Link-Belt can also supply a full range of flanges, thrusts, covers, saddles and countershaft ends.

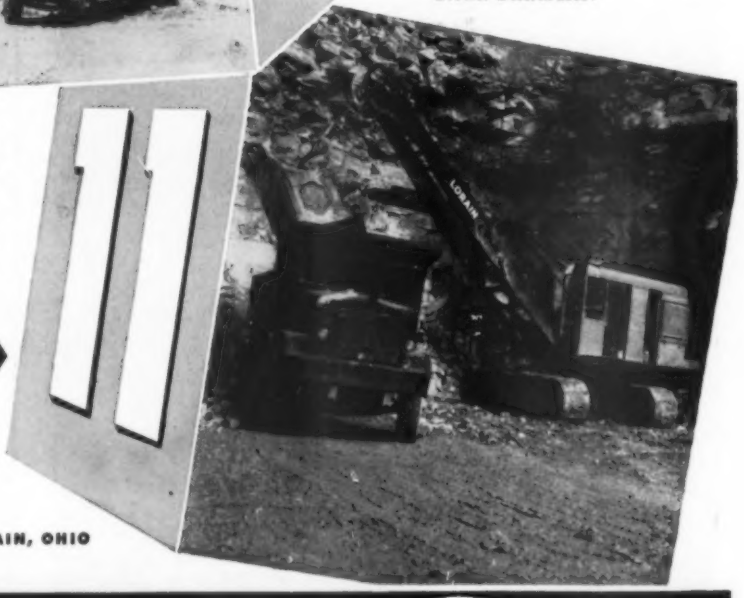
YOU'RE SURE TO Win Profits- .... WITH LORAINS

Here are two quarries that don't gamble with shovel performance. Proof, it's a 7-11 ownership combination ... proof that Lorain ownership must pay dividends in performance.

It's Lorain "Balanced Quality" that gives Lorains such long, dependable and profitable service. "Balanced Quality" means not just a few, exclusive, outstanding features—Lorains have many of these—but correct design, the best materials and controlled manufacturing processes throughout the *whole machine*. That's why some Lorains have been on the job for 30 years or more.

Don't gamble when you buy your next shovel crane ... be sure of a profit producer ... see your Thew-Lorain Distributor!

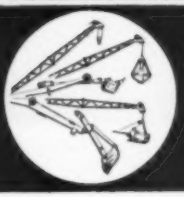
Union Building and Construction Co. of Passaic, New Jersey, put one of their 2-yard Lorain-820 shovels in their Clifton, N. J., quarry to bite into the tough face of rock shown above. For them, Lorains have been a 7-time "winner"... and they wouldn't come back for more unless Lorains delivered the goods.



Ralph Rogers & Co. of Bloomington, Indiana, hit top capacity in their Hillsboro, Tenn. pit with a 1¾-yard Lorain-80 shovel loading out the almost solid rock to feed the primary crusher. This efficient operator has repeated with Lorains 11 times. What better proof of profit-producing performance is needed?

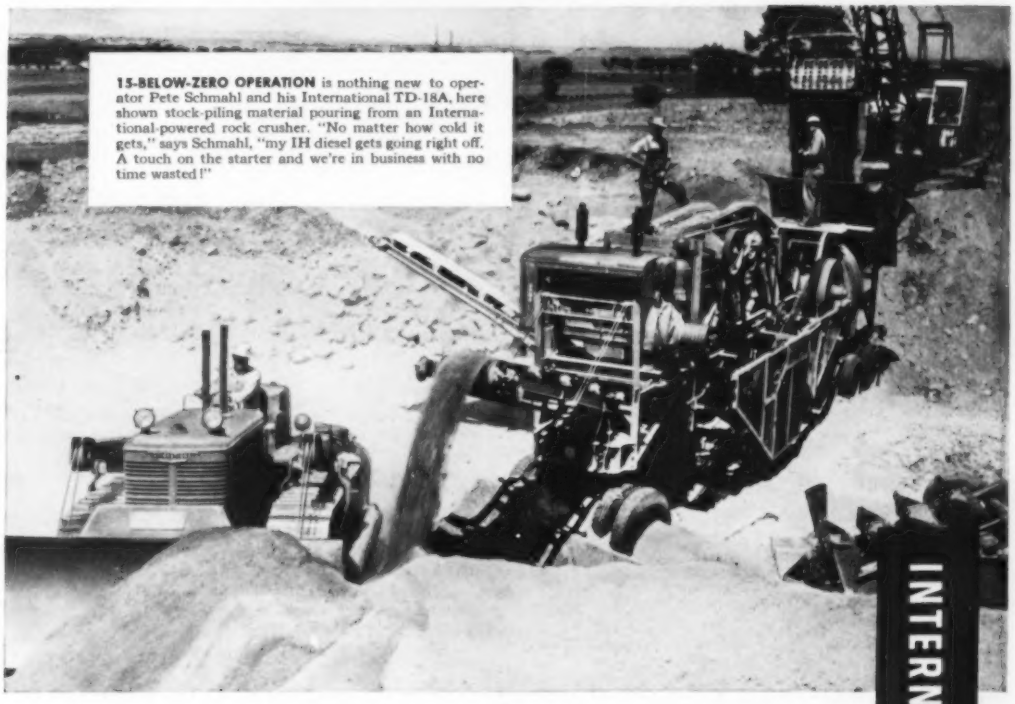
THE THEW SHOVEL CO., LORAIN, OHIO

THEW **LORAIN**®
on CRAWLER or RUBBER



SHOVELS
CRANES
DRAGLINES
CLAMSHELLS
HOES

Rocky Mountain ROCK CRUSHER



15-BELOW-ZERO OPERATION is nothing new to operator Pete Schmahl and his International TD-18A, here shown stock-piling material pouring from an International-powered rock crusher. "No matter how cold it gets," says Schmahl, "my IH diesel gets going right off. A touch on the starter and we're in business with no time wasted!"

Versatile Colorado contractor finds International power pays off on every job

Colorado's Winslow Construction Company handles almost every phase of moving and processing earth and rock. They excavate, build roads, produce crushed stone, clay and sand for their own and other construction jobs.

All along the line, they rely on International crawlers and power units. For example, to supply cushion material for the new Denver-Boulder super-highway, Winslow uses a UD-18A engine to run the rock crusher, and a TD-18A crawler to stockpile finished material and push raw rock up to the dragline.

"We've got eighteen Internationals," says Winslow, *"because we demand machines that give minimum operating costs and maximum work done per day. Also we get constant attention from our International Industrial Distributor. He figures his job isn't over when he makes a sale. His goal is a satisfied customer. And we're more than satisfied. We're enthusiastic!"*

Get the low-down on International machines from your distributor. Put *"Power that Pays"* to work for you!

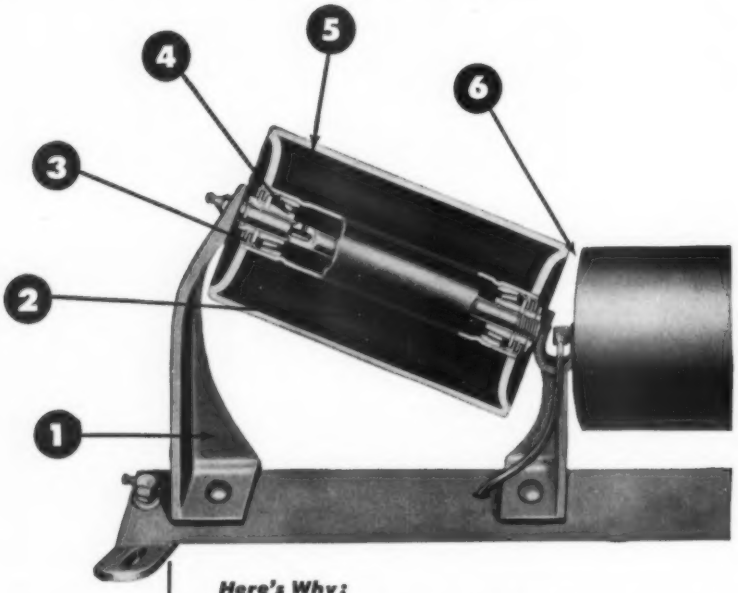
International Harvester Company, Chicago 1, Ill.

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

make sure you get full value for your belt conveying dollar



When you're figuring the cost of moving material by belt conveyor, it's important to remember that the belt idler, more than any other item of equipment, determines how low the ultimate cost per ton of material handled will be. Power consumption, belt life, maintenance costs, steady production flow, are all largely dependent on the ability of the idlers to keep rolling.

To make sure you get the most for your belt conveying dollars, you'll find it pays to standardize on Rex® Belt Conveyor Idlers.

Here's Why:

1. **The supporting brackets are unbreakable in normal operation. They remain rigidly tight and will stand abnormal usage without breaking.**
2. **The bearing mountings maintain positive bearing alignment under all conditions.**
3. **Rex Idlers have positive and permanent bearing protection against dust and dirt, and require minimum service attention . . . once every 1000 hours in normal operation.**
4. **Rex Idlers have high grade, precision, antifriction bearings with ample radial and thrust load capacity. This means lowest power consumption under all conditions.**
5. **The roll shells are of permanent unit construction with no joints to loosen or corrode. No replacements until idler is completely worn out.**
6. **The idler rolls are smooth and concentric and spaced in the idler assembly to protect the underside of the belt. The roll units are interchangeable for easy servicing.**

If your idlers have all these features, you're getting the most for your idler dollar . . . you're using Rex Idlers. If you're using any other idler, it can't possibly have all these outstanding features . . . you can't be getting lowest possible cost per ton handled on your belt conveyor.

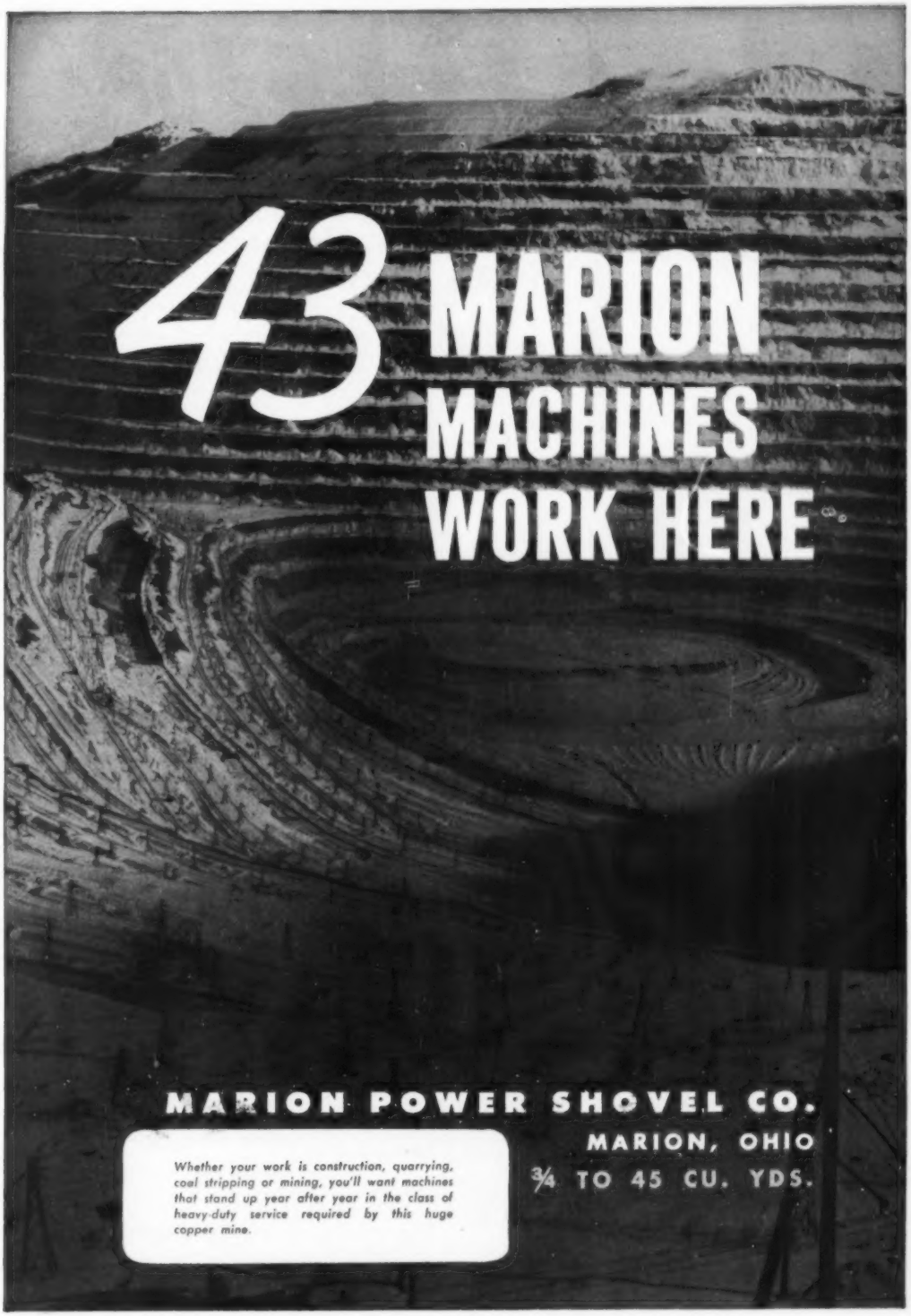
So, if you haven't yet standardized on Rex Idlers, call your nearest Chain Belt Field Sales Engineer. He'll give you all the details. Or, if you prefer, write for Bulletin 51-81. Chain Belt Co., 4604 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY ®

Chain Belt COMPANY
OF MILWAUKEE

Atlanta • Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • El Paso • Houston Indianapolis • Jacksonville • Kansas City • Los Angeles • Louisville • Midland, Texas • Milwaukee • Minneapolis • New York • Philadelphia Pittsburgh • Portland, Oregon • Springfield, Mass. • St. Louis • Salt Lake City • San Francisco • Seattle • Tulsa • Worcester

Distributors in principal cities in the United States and abroad.


43 MARION MACHINES WORK HERE
MARION POWER SHOVEL CO.
MARION, OHIO
¾ TO 45 CU. YDS.
Whether your work is construction, quarrying, coal stripping or mining, you'll want machines that stand up year after year in the class of heavy-duty service required by this huge copper mine.

...with PERFORMANCE UP

COSTS GO DOWN!

For Top Performance Specify

LULL Shoveloader

For high profits and low costs you need top performance from your equipment. Shoveloader's value as a real money maker is based on its proven ability to move more materials . . . faster and at lower cost.

Shoveloader's *power crowd* always scoops up a full bucket. The operator has finger-tip, hydraulic control of crowding, hoisting and tilting at all times. Shoveloader's higher lift and longer reach gets in close—loads bins and trucks from one position . . . cuts backing and turning. These operating features add up to a faster loading cycle—more material moved per day, per machine, per operator.

Loading, digging, crowding, bull dozing, snow removing . . . Shoveloader's superior performance can earn you bigger profits!

Get all the facts on the Lull Shoveloader! See your Lull Distributor, Today!...or Write for Bulletin!

LULL Manufacturing Company

356 W. 90th Street • Minneapolis 20, Minn.

Mr. Turner WRITES
ST. FRANCIS MATERIAL COMPANY
BOX 788
FORREST CITY, ARKANSAS
May 5, 1952
Thomas Foundries, Inc.
Birmingham
Alabama
Gentlemen:
We have received the spare impeller, shell liner, etc., for our
6" Thomas Sand and Gravel pump which has been in service nearly
a year at our Parkdale, Arkansas, plant.
We recently cleaned this pump (which has been moved to Sparkman,
Arkansas) and believe the original impeller will be good for
several more months' operation.
Comparing our past experience with pumps, we have already handled
several times more material with the Thomas pump and, as mentioned,
have not worn out the first impeller.
On our other pumps with 6" suction, we frequently encounter de-
lays due to large rock hanging in the impeller, or have not
encountered this difficulty with your pump as it appears that
anything that will go through the suction pipe will be handled
on through your pump without hanging.
We expect to make any future replacements in our operations with
the Thomas Pump.
Yours very truly,
ST. FRANCIS MATERIAL CO.
Chas. T. Turner

—And Says He WANTS MORE THOMAS DREDGE PUMPS

"In service nearly a year and good for several more months' operations."

Who says that? Not us. It is the USER of a Thomas Sand and Gravel Pump — Charles T. Turner of St. Francis Material Company, Forrest City, Arkansas.

Read Mr. Turner's letter, reproduced above. It is field-tested proof that Thomas Dredge Pumps last several times longer than conventional type pumps. Less shutdown troubles, lower pumping costs, more material handled. *Reason:* Thomas Pumps are especially designed so they can be made of Ni-Hard, a special high abrasion-resistant metal.

Mr. Turner has had several years' experience with pumps of other manufacture. Now after a thorough test of a Thomas Pump under practical operating conditions, he frankly says:

"Future pumps in our operation will be Thomas Pumps."

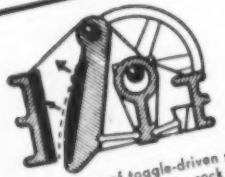
Mr. Turner's letter means that it will pay you to investigate a Thomas Pump for your own use. For prices and literature, write THOMAS FOUNDRIES, Inc., Post Office Box 1111, Birmingham 1, Alabama.

IF YOU DO IT WITH SAND & GRAVEL PUMPS, YOU CAN DO IT BETTER WITH A "THOMAS"

Here's why KUE-KEN's jaw plates outwear any other crusher's 5 times!

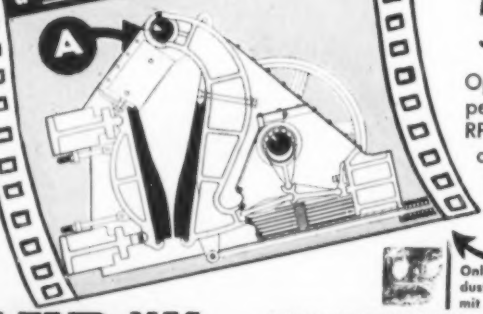
SEE HOW OTHER JAW CRUSHERS ACT LIKE GIANT GRINDING WHEELS . . . GRINDING AWAY JAW PLATES WITH EVERY STROKE

Moving jaw, driven by an overhead eccentric, forces rock both up and down causing severe rubbing and wear on jaw plates. Overhead eccentric type.



Unbalanced action of toggle-driven swing jaw imparts upward motion to rock causing terrific abrasive action on jaw plates. Blake type.

HERE'S KUE-KEN . . . with a new crushing principle!

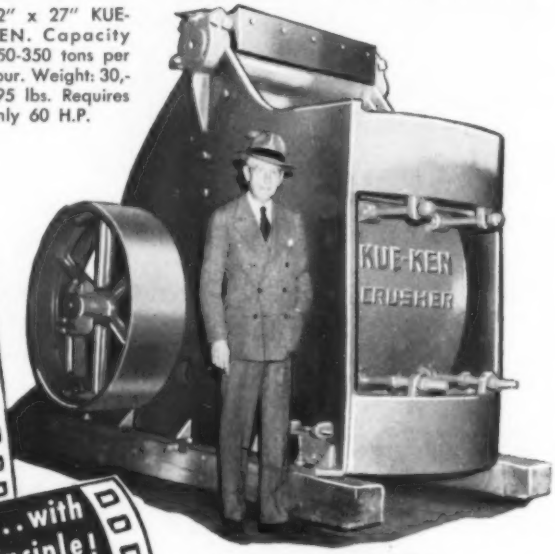


A

Hinge pin is so located that jaw swings in a straight line without upward or downward motion. Rock is instantly gripped and crushed. Learn how you can do any crushing job faster, better and at less cost with a Kue-Ken Crusher.

Only KUE-KEN crushes with firm, direct strokes that practically eliminate jaw plate abrasion!

42" x 27" KUE-KEN. Capacity 250-350 tons per hour. Weight: 30,495 lbs. Requires only 60 H.P.



KUE-KEN *IS THE FASTEST OPERATING JAW CRUSHER!*

Operating at 375 crushing strokes per minute (compared with 250-300 RPM for other well-known makes of crushers), *Kue-Ken* provides *far greater capacity* and a finer, more uniform product!

SELF-LUBRICATING

Only *Kue-Ken* seals all mechanism against dirt and dust in a "crankcase type" filtered oil bath to permit safe, high-speed, long life operation.

Write for Factual Illustrated Data

STRAUB MFG. CO.

545 CHESTNUT ST. OAKLAND 20, CALIF.

KUE-KEN Pronounced "Gue-Ken." U. S. and foreign patents pending.

DEALERS: LUND MACHINERY CO., Salt Lake City, Utah: CLOSNER EQUIPMENT CO., San Antonio, Texas: WASHINGTON MACHINERY & STORAGE CO., Seattle, Wash.: CONSTRUCTION EQUIPMENT CO., Spokane, Wash.: HEWITT ROBINS INC., Pasadena, Calif.: EDWARD L. KROPP CO., Portland, Ore.: CAL-ORE MACHINERY CO., Medford, Ore.: ANAHUAC MACHINERY CO., Mexico City, Mexico: UNIVERSAL EQUIPMENT CO., Vancouver, B. C.

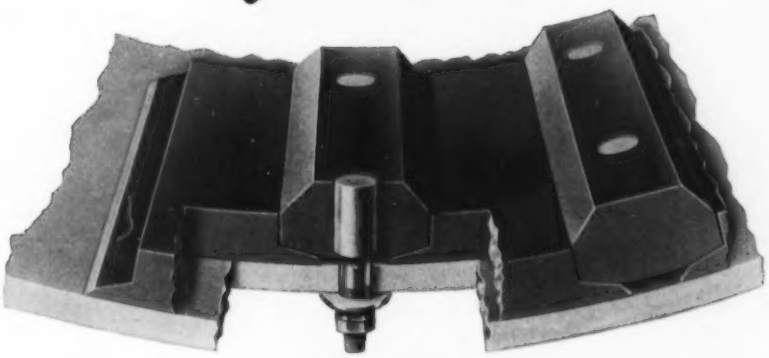
Pennsylvania Crusher Co., Exclusive Licensed Eastern Manufacturer and Distributor Broad and Arch Streets, Philadelphia, Pennsylvania.

Sir W. G. Armstrong Whitworth & Co. (Ironfounders) Ltd., Authorized Licensed Manufacturer and Distributor Close Works, Gateshead-upon-Tyne, England.

When you install

U·S·S LORAIN ROLLED PLATE LININGS

you save



Save on installation time and labor. Lorain Liner Plates are made to accurate size and in easily-handled sections . . . can be installed quickly and easily.

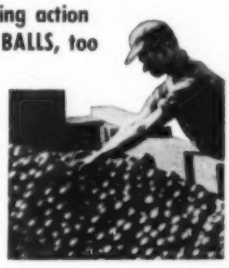
Save valuable grinding space. Because of the strength and resistance to breakage of the rolled steel from which U·S·S Lorain Rolled Plate Linings are made, plates of reduced thickness can be used, thereby increasing the usable diameter of the mill . . . boosting output.

Save on "time out" for repairs. Close fits between ends of plates and between plates and lift bars of U·S·S Lorain Rolled Plate Linings eliminate shell wash and allied troubles which result eventually in costly mill repairs.

Save on replacement materials. Lorain Liner Plates are so rugged they'll wear 'til they're paper thin without failing! And because the plates are interchangeable, severe localized wear at feed or discharge ends of the mill may be balanced just by reversing the worn plates to the opposite end. You get the full life of your linings when they're U·S·S Lorain Rolled Plate Linings!

There are U·S·S Lorain Rolled Plate Linings to fit any type of mill—for wet grinding or dry. Available through leading mill manufacturers whose names will be furnished upon request.

For uniform, efficient grinding action specify U·S·S GRINDING BALLS, too



● For still lower grinding costs and higher grinding efficiency, specify U·S·S Grinding Balls for your mill. They're made to exacting specifications . . . are carefully tested from raw materials to finished product to assure surface hardness and maximum hardness penetration. Available in diameters from ¾" to 5". For further information send for our free booklet on U·S·S Grinding Balls.

United States Steel Company
Room 2801N, 525 William Penn Place
Pittsburgh 30, Pa.

Without obligation on my part, please send me your FREE booklet on U·S·S Grinding Balls.

Name .....

Company .....

Address .....

City ..... State .....

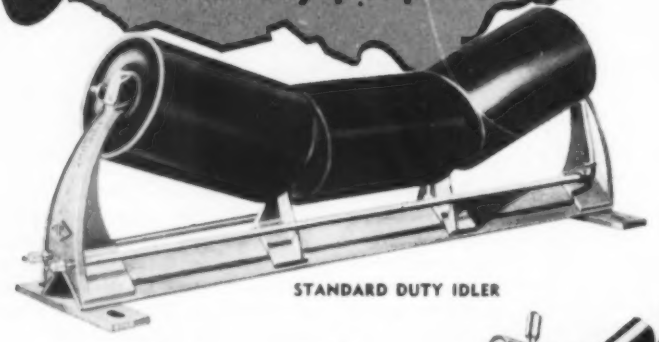
UNITED STATES STEEL COMPANY, PITTSBURGH, PA. • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S LORAIN ROLLED PLATE LININGS AND U·S·S GRINDING BALLS

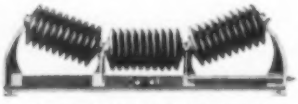
2-094

UNITED STATES STEEL

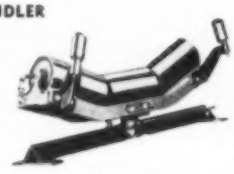
THERE'S A ..... Continental IDLER for every purpose



STANDARD DUTY IDLER

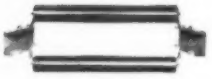


RUBBER DISC IMPACT IDLER



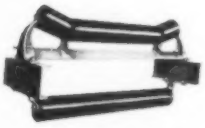
SELF-ALIGNING TROUGHING IDLER

SELF ALIGNING FLAT BELT IDLER

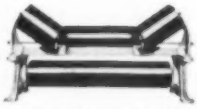


FLAT BELT IDLER

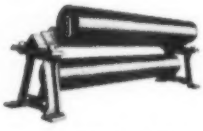
HEAVY DUTY IDLER



PICKING TABLE IDLER



GRAIN CONCENTRATOR IDLER



GRAIN FLAT BELT IDLER

UNIT STAND IDLER

Specify CONTINENTAL .....

Belt conveyors are used for handling many types of material. For this reason, Continental manufactures a variety of Idlers, each designed to best take care of a particular application.

When ordering your next Belt Conveyor, specify Continental Idlers and take advantage of their complete line.

Most standard size Idlers can be shipped FROM STOCK. Other sizes can be shipped promptly.

CG-4002

INDUSTRIAL DIVISION

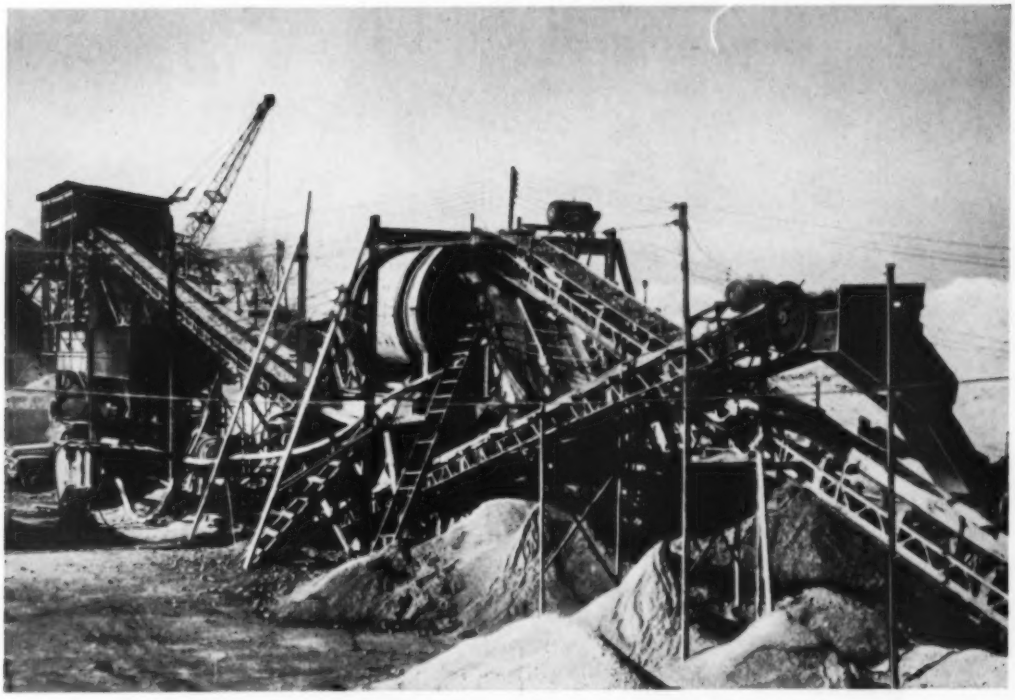
CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

"SINCLAIR LUBRICANTS CUT OUR MAINTENANCE COSTS!"

SAYS BUFFALO SAND & GRAVEL CO., SILVER HILL, MD.



Preventive maintenance and Sinclair Lubricants are credited with forestalling any major repairs on this Vibrator and Telsmith Superscrubber over 3½ years of continuous operation

Every year the Buffalo Sand & Gravel Co. processes and moves 350,000 to 400,000 tons of high-grade washed sand and gravel.

Says General Superintendent Don Carruth: "We've used Sinclair Lubricants 100 per cent for over three years.

"Sinclair SUPER TENOL® and TENOL® have helped us to reduce maintenance costs on our power units and on all the trucks in our large fleet.

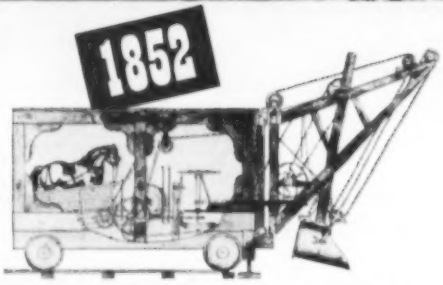
"We've minimized repairs to transmissions and differentials since changing over to Sinclair Gear Lubricants.

"For lubrication of chassis, universal joints and many miscellaneous applications, Sinclair LITHOLINE® has reduced our inventory—and it's giving excellent results."

Why not learn how Sinclair Lubricants can help *you*? There is no obligation. Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR LUBRICANTS

100 years of progress in OSGOOD shovels



OSGOOD'S 2-horse power excavator

of 100 years ago was powered by a team of horses on a treadmill inside the machine. Although crude by today's standards, this excavator embodied the four principal functions of a modern power shovel: (1) Crowd (2) Hoist (3) Swing (4) Travel. Then, as now, the name OSGOOD stood for sound engineering.

Progress in excavating equipment has been rapid during the past 100 years, but one thing has not changed. Now, as in 1852, the most efficient, most advanced earth-moving equipment is built by OSGOOD — oldest name in the power shovel and crane industry.

Through the years, OSGOOD has been noted for its unparalleled engineering leadership, and today's OSGOOD machines are unequalled in ability to increase your profits.

You owe it to your future to investigate the many modern OSGOOD features designed to increase work capacity, reduce maintenance, and cut down-time. Find out why OSGOOD shovels are setting new production records on jobs from coast to coast. Write today.

MEMBER PCSA

EQUIPMENT DESIGNED WITH YOUR PROFIT IN MIND

9214

The OSGOOD COMPANY

MARION, OHIO

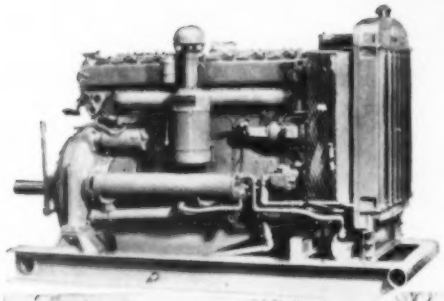
AFFILIATED WITH THE GENERAL EXCAVATOR CO.

POWER SHOVELS, CRANES, DRAGLINES, CLAMSHELLS, PILE DRIVERS & HOES. CRAWLER, TRUCK OR WHEEL MOUNTED. DIESEL, GASOLINE OR ELECTRIC POWERED. CAPACITIES ½ TO 2½ CU. YD.

Here's why

MURPHY DIESELS

put more power into your job with longer life and less maintenance



Murphy Diesel rated at 100 H.P., continuous, powering a Diamond portable primary rock plant.

MURPHY DIESEL

THE power a diesel engine develops is dependent to a great degree on the breathing capacity of the valves. Breathing capacity of the valves in turn is determined by the circumference of the valves and their lift. Thus, when we compare Murphy Diesel's 4 valve design with the conventional 2 valve design of equal total valve area, simple arithmetic shows that total circumference of the 4 valve arrangement is 41.4% greater. With equal lift, the breathing capacity is also 41.4% greater.

At the same time, Murphy design provides 41.4% more metal-to-metal contact between the circumference of the valve and the seat for dissipation of valve heat. This, coupled with the smaller valve radius in 4 valve design (which means the heat has a shorter distance to travel to escape), explains why Murphy valves run cooler and rarely, if ever, have to be ground.

Four valves per cylinder is just one of the many reasons for Murphy's high standards of performance and economy. Others are given in the booklet "10 Questions to Ask a Diesel Engine Salesman". Get a copy from your Murphy Diesel Dealer or write direct.

Heavy duty power

for rock crushing

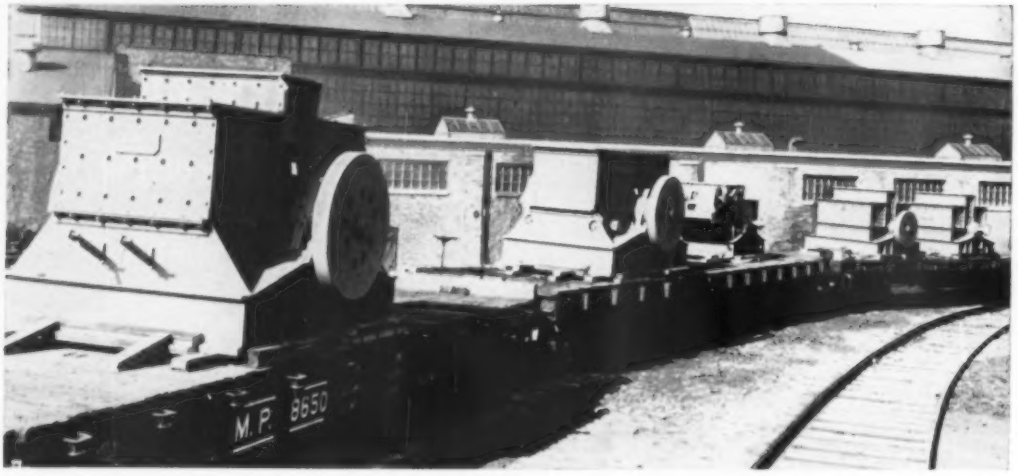
Murphy Diesel Engines and Power Units for portable or stationary crushing plants, 90 to 226 H. P. 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W.

226

MURPHY DIESEL COMPANY

5307 W. Burnham St. Milwaukee 14, Wisconsin

Sales, Parts, Service in Principal Cities



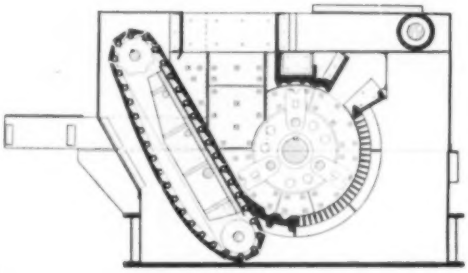
50 CARLOADS

(PARTIAL SHIPMENT FOR ONE CUSTOMER)

BULLDOG HAMMERMILLS

[PRIMARY — SECONDARY — FINE REDUCTION]

BULLDOG HAMMERMILLS
for
DRY OR WET STICKY MATERIALS.
FOR THOSE TOUGH HEAVY-DUTY
CRUSHING JOBS—
1 to 1000 Ton Capacity.



We will gladly survey your reduction requirements and recommend the proper equipment without cost or obligation. Just write or call.

ASK FOR LIST OF INSTALLATIONS

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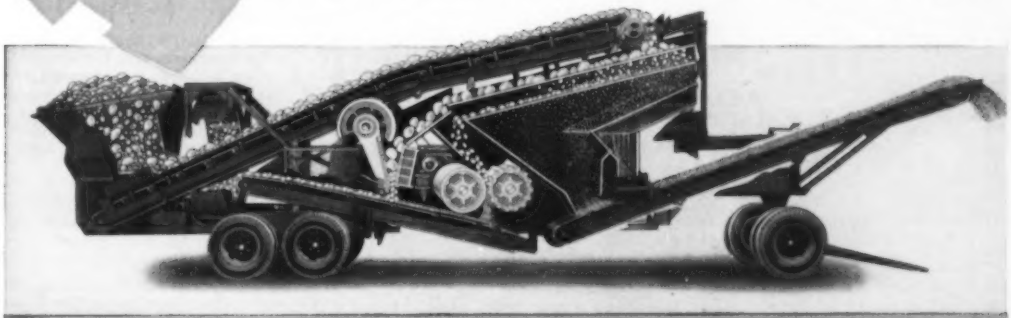

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Universal's "Scalping Deck" method of screening assures balanced loads to the jaw and roll crushers . . . provides greater efficiency and economy, protects screen, jaws, and rolls. You get better gradation of material, less jaw wear, less roll shell wear, longer screen life, savings in power, more effective use of screening area, faster material flow, greater plant output. These all add up to more tons per hour at less cost per ton with the new Universal 880 Gravelmasters.

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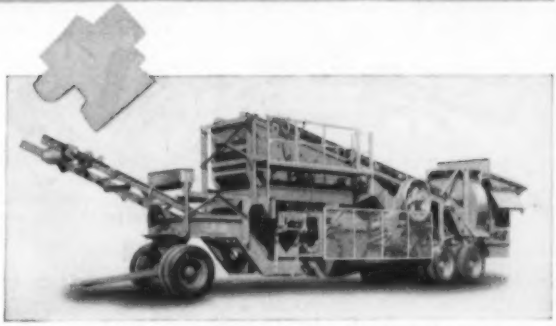

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Plant mounted power or side drive through universal joint from separate truck mounted power. An outstanding new high capacity Gravelmaster, designed to meet state highway weight limitations.

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OF A SERIES
ON HOW TO

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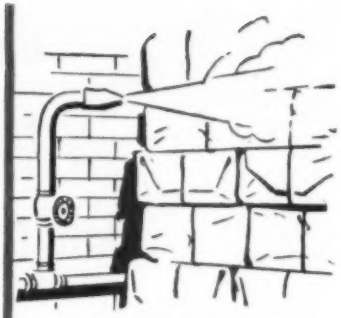
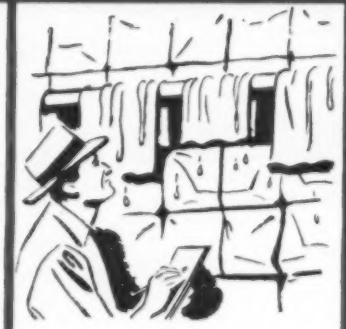
Keep Storage Rooms Humid:



1. Let steam escape in bag storage room to keep air and bags humid. Keep a humidity indicator in the storage room and check it frequently. Always leave aisles or spaces between stacks of bags to allow circulation.

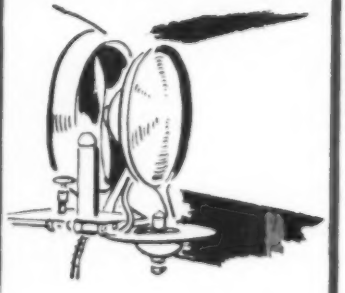
2. Store bags on dunnage, away from floor, and keep floor wet so moisture can be absorbed into air. A relative humidity of about 50% at warm temperature is best.



3. Drill small "needle" holes in horizontal water pipes. Hang cloths over holes. Air absorbs moisture from wet cloths.

4. Hang wet cloths over edge of water barrels. Cloth absorbs water and air absorbs moisture from cloth. Keep barrels well filled.

5. Open windows on damp or rainy day. Damp outside air will circulate in the bag storage room. Multiwalls are strongest when moisture content of the paper is about 6 or 7%.



6. Use commercial humidifying apparatus. Many types of commercial humidifiers are available with capacities to suit individual requirements.

Want the Whole Story?

Ask your Bemis Man for free, illustrated copy of Bemis Multiwall Packaging Guide. It deals with Storage, Filling and Closing, Handling, Palletizing and other important subjects.

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If you need cotton or burlap bags also, Bemis is your best source.

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BEMIS BRO BAG COMPANY

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"With loads averaging over 6½ tons, my running costs are

Only 5¢ a mile"

says L. B. Myers, Joplin, Mo.

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MISSOURI
Report No. 11174

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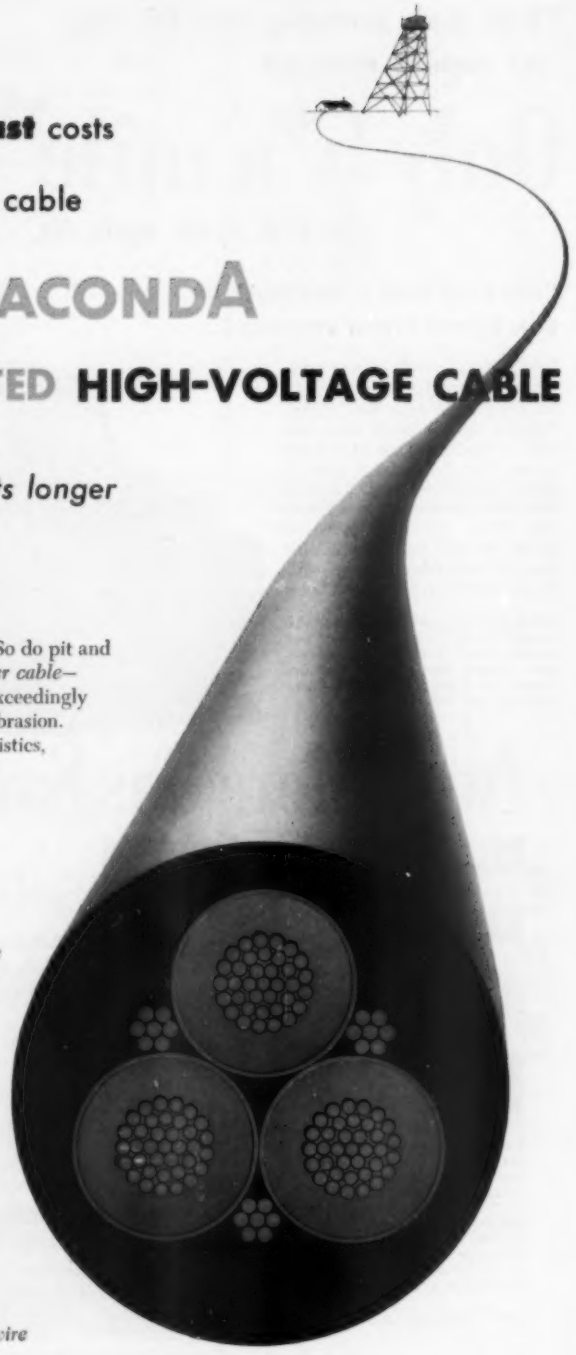

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Faster! Easier! At Lower Cost!

GENERAL L. C. M.—for most work off-the-road. Massive tread and thick, tough shoulders develop extra traction. Extra wear on tough, jagged surfaces. Stronger rayon cord body with more natural rubber built into its shock-absorber design.

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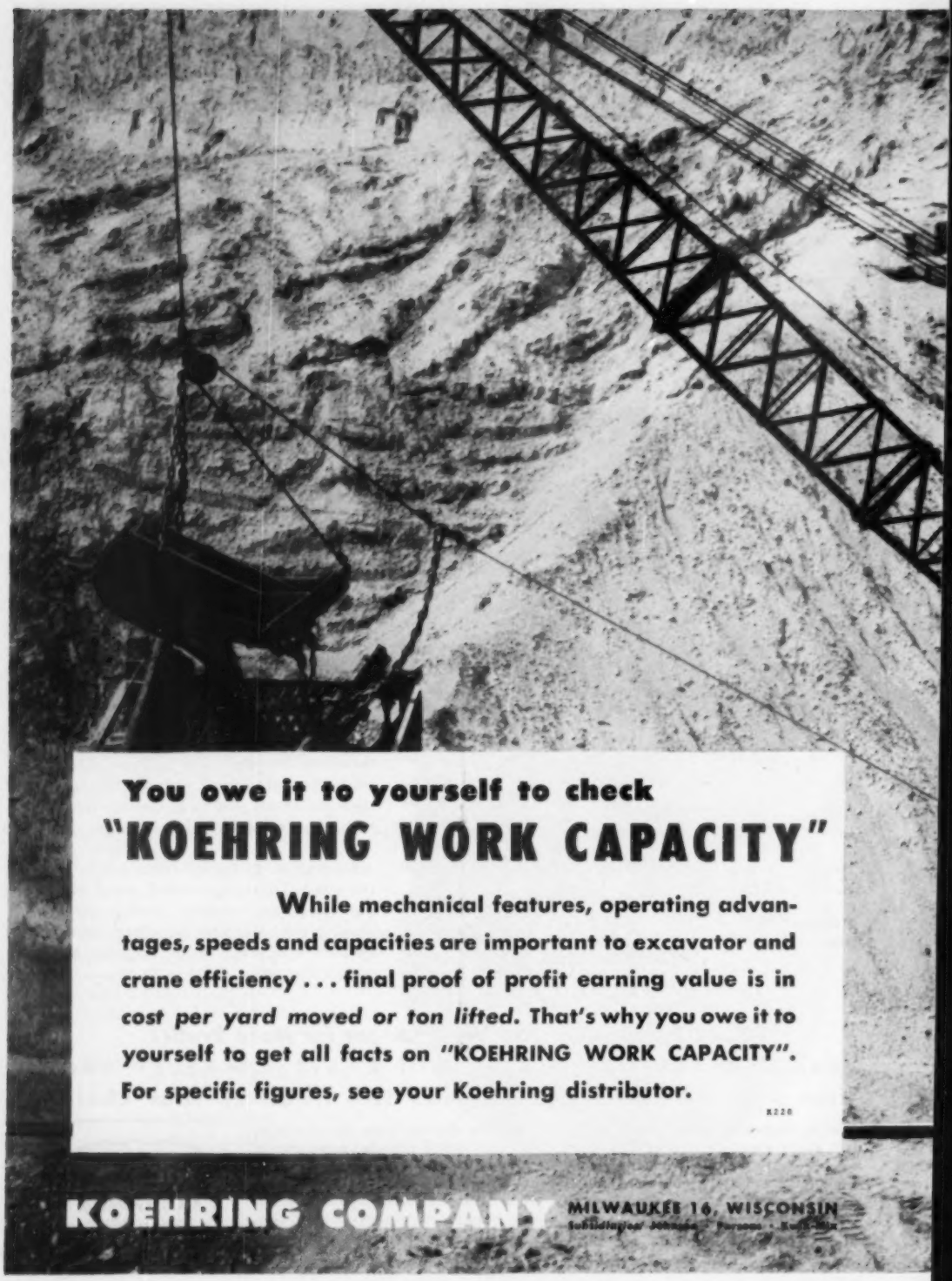

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While mechanical features, operating advantages, speeds and capacities are important to excavator and crane efficiency . . . final proof of profit earning value is in *cost per yard moved or ton lifted.* That's why you owe it to yourself to get all facts on "KOEHRING WORK CAPACITY". For specific figures, see your Koehring distributor.

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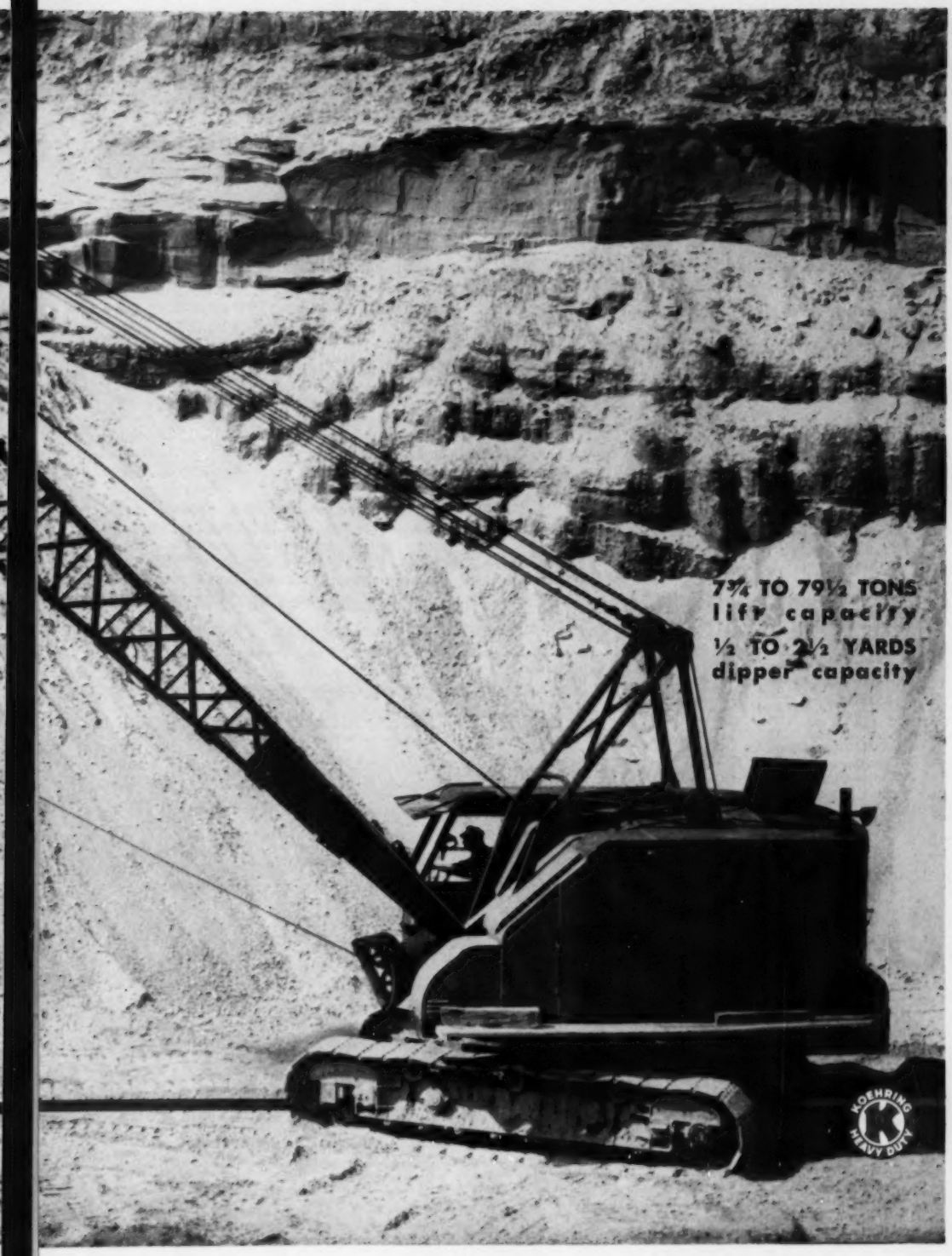
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½ TO 2½ YARDS
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HEAVY DUTY

VOL. 45 JULY 1952 No. 1

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F-"85"

F-"85" is a special purpose cast steel which can be heat treated through selective processing. Treads and flanges are toughened and hardened for maximum resistance to shock and abrasive wear.

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Farrell's Hard Edge cast steels produce wheels in which treads and flanges are processed and treated through a depth of from 1-8" to 5-16", according to the size of the wheel. This extremely tough, hardened surface is backed with alloy steels having a Brinell rating of from 285 to 315. All Farrell wheels are supplied with either straight, tapered, or radiused treads . . . bushed or finished.

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Light Section Castings.

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SANDUSKY, OHIO U.S.A.

editorial

Freight Rate Increase Absorption Permitted

THE Office of Price Stabilization on June 19 issued Supplementary Regulation 106 to the General Ceiling Price Regulation, to become effective June 24. This long-awaited supplementary regulation to GCPR permits producers, manufacturers, and resellers of specified building and construction materials to adjust their ceiling prices to reflect certain increased transportation costs resulting from freight rate increases authorized after January 26, 1951. Among the building and construction materials to which this supplementary regulation applies are:

Blast furnace slag, except when used as an agricultural liming material

Calcined gypsum plasters and Keene's cement

Cement, including standard portland, special portland such as high-early-strength masonry or mortar, low and moderate heat, oil-well, sulphate-resisting, white, or any other cement generally classified as special portland cement; alumina cement, natural cement, puzzolan (slag-lime) cement; and masonry cement of the natural cement class

Concrete products

Crushed stone, except when used as an agricultural liming material

Gravel

Gypsum products, including but not limited to board, lath, partition and roof tile, but excluding acoustical tile.

Lightweight aggregates; the expanded materials—perlite, vermiculite, blast furnace slag, shale, and slate; the sintered materials—blast furnace slag, clay, coal cinders, diatomaceous earths, fly ash, shale, slate; and the naturally occurring volcanic materials—pumice, scoria and tuff

Lime (construction, metallurgical, chemical, and refractory) except when used as an agricultural liming material; and

Sand.

Manufacturers and producers may apply the exact dollars and cents amount of increases in outbound transportation costs to their GCPR ceiling delivered prices of the commodities covered, except ready-mixed concrete, asphaltic concrete, and bituminous paving mixes.

Resellers of these materials are permitted to adjust their GCPR ceiling prices to reflect authorized inbound freight rate increases in accordance with the requirements of the Defense Production Act of 1950, as amended.

MANUFACTURERS of ready-mixed concrete, concrete products and asphaltic concrete and bituminous paving mixes, who have incurred increases in the costs to them of the above materials which enter into the manufacture of these products, may increase their ceiling prices for these products, provided that such increases are the result of authorized inbound freight rate increases. Ceiling prices for the various products in each category which are manufactured may be adjusted by a formula which must be applied separately to each category.

The OPS states that, in view of the sizable increase in freight rates since January 26, 1951, there are grounds for believing that the earnings of the sand-and-gravel, ready-mixed concrete and concrete products industries have been reduced below the minimum requirements of the earnings or product standard. Rail freight rate increases effective April 14, 1951, August 28, 1951, and May 2, 1952, authorized by the ICC generally totaled 15 percent. An exception was the 12 percent increase for sand, gravel, and stone (crushed, broken, or ground). It was realized that absorption of such increases placed too severe a burden on producers, resellers, and users of such low cost, bulky materials.

THIS supplementary regulation was formulated after consultation with industry representatives, including trade association representatives, and their recommendations were given consideration. Formal consultation was also held with representatives of the ready-mixed concrete, crushed stone, sand-and-gravel, and structural clay products industries. Other building materials industries which can demonstrate the need for relief under the criteria established in Supplementary Regulation 106 may also apply to the OPS.

Who Should Clean Freight Cars?

WITH the season drawing near when there is usually the most severe shortage of all kinds of freight cars, it might be advisable for individual producers to study means for helping to reduce or even eliminate such a shortage. Some producers, of course, are so situated that they suffer more than others from shortages but nearly all have been affected to some extent in recent years and all can and should help. More efficient use of cars can be attained in many ways—by prompt loading and unloading, by reducing turn-around time, by preventing damage to cars in loading and unloading, by carefully cleaning them out when unloading, etc.

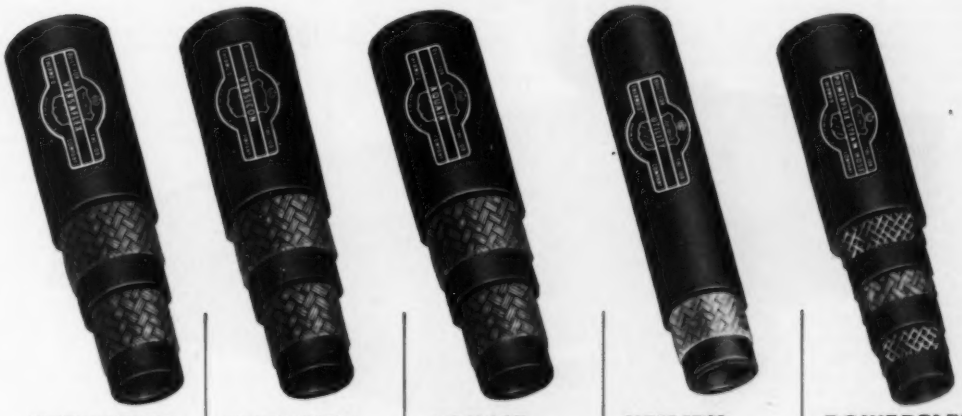
The Clean Car Committee of the Mid-West Shippers Advisory Board says that if shippers and receivers of freight would completely clean all freight cars after unloading them, the railroads would save millions of dollars annually and much loss of time would be eliminated. The extra cost of cleaning these cars, with the delays involved is, it is stated, ultimately reflected in the freight rates shippers pay for the transportation of their goods.

Some producers are rejecting cars which are unclean or in bad repair and are getting away with it. Others are cleaning them out and absorbing the cost. Still others are cleaning the cars or having them cleaned and are billing the railroads for the cost, and are being repaid, as the railroads prefer this to the cost and delay of sending the cars back to their closest cleaning point.

Walter E. Trauffer

now! 5 basic types of Thermoid hose do the work of eighteen!

The new Thermoid line of molded hose cuts handling time and storage costs 70% or more in a wide variety of industrial and commercial uses! Thermoid's "Basic Five": Versaflex . . . Versicon . . . Aquair . . . Utility . . . Powerflex . . . now combine simplification and versatility with Thermoid top quality construction. And Thermoid's new standard color identification eliminates confusion in storage and stock selection!



VERSAFLEX
Multi-purpose hose built to withstand higher pressures. Recommended for butane, propane, insecticides, etc. Color code: *Red*.

VERSICON
A true all-purpose hose for virtually every type of air, gas or liquid. Color code: *Brown*.

AQUAIR
Rugged, dependable hose for handling air, water, welding gases. Color code: *Green**.

UTILITY
Most practical hose for air, water and illuminating gases at pressures from 75 to 125 psi. Color code: *Black*.

POWERFLEX
Designed specifically for super heated steam at pressures from 100 to 200 psi. Color code: *Black*.

You can definitely simplify your buying, inventory, storage and stock selection with Thermoid's color-coded "Basic Five". Get full information from your distributor or write direct for Hose Catalog No. 3680. It's yours for the asking.

**Also furnished with Red Cover for acetylene*

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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Industrial Brake Linings and Friction Materials

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It's designed especially for top kiln performance!

TAKE a close look at Permanente Periclase-Chrome bricks for rotary cement kilns and you'll find they cut down-time for replacements to a minimum—give you higher production. That's because they are *developed especially* for hot zone linings.

Their special design combines high purity, pre-shrunk periclase grains with an *exclusive* patented bonding medium. Result: a kiln lining of maximum refractoriness with high resistance to chemical attack by cement clinker.

Verified performance records show that Permanente Periclase-Chrome brick have withstood as many as *17 shutdowns for various causes without any loss of brick due to spalling.* They take a good coating, hold it well, and have great resistance to thermal shock.

If you feel that an appraisal of your rotary kiln performance would be helpful, Kaiser Chemicals will be glad to work with you. Installation assistance also is available at no extra cost.

Standard brick sizes supplied in both burned and chemically bonded forms. Recently expanded facilities insure superior service. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

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news of the industry

PIT AND QUARRY

2 Nonmetallic Operations Win "Sentinels of Safety" In Mines Bureau Contest

Six mines, quarries, and open pits whose safety records were the best in their groups in 1951, were awarded "Sentinels of Safety" trophies by J. J. Forbes, Director of the Bureau of Mines, United States Department of the Interior.

The two nonmetallic operations among the six trophy winners in the various classifications are as follows:

Underground nonmetallic mines: Retsof mine, International Salt Company, Inc., at Retsof, N. Y., for working 561,198 man-hours without a lost-time injury.

Stone quarries: Port Island quarry, Inland Lime and Stone Company at Gulliver, Mich., for working 808,389 man-hours without a lost-time injury.

The awarding of the trophies marked the 27th National Safety Competition, which is conducted by the Bureau. The six bronze trophies, donated by *The Explosives Engineer Magazine*, are retained by the winners for one year and are transferred to the winners of the following year's competition.

Director Forbes awarded Certificates of Achievement in Safety to 128 other mines, quarries, and open pits which had injury-free records or which finished second, third, fourth, or fifth in the six classifications.

Operations must have worked 30,000 or more man-hours during 1951 to be eligible for certificates.

A total of 585 mineral operations enrolled in the 1951 competition, a gain of 10 over the 1950 enrollment and 375 more than entered in 1925, the competition's first year. Man-hours of exposure in 1951 totaled 180,258,242 for all the contestants, the greatest number in any year during the 27-year history of the contest.

Perfect safety records were reported by 158 of the 585 mines and quarries enrolled in the 1951 contest. These 158 operations worked a total of 18,580,609 man-hours without a disabling injury. Statistics of the 1951 competition indicate that the competing mines and quarries had safety records much better than that of the industry as a whole.

The 1951 injury-frequency rate of 28.065 per 1,000,000 man-hours of exposure was the lowest on record. The injury-severity rate of all the competing plants in 1951 was 5.915 days lost per 1,000 man-hours of work.

The Bureau recognizes the individual worker's part in protecting himself and his fellow workers from disabling injuries by awarding a Certificate of Accomplishment in Safety to each employee at an operation that wins a "Sentinel of Safety" trophy. For 1951, approximately 1,550 of these certificates will be awarded workers at the winning plants.

Coming Events

July 9-10, 1952 — Detroit. Mid-year meeting, National Slag Association. Book-Cadillac Hotel.

August 17-23, 1952—State College, Pa. Sixth International Grasslands Congress.

September 3-6, 1952—Chicago. Fall regional meeting, Industrial Minerals Division, American Institute of Mining and Metallurgical Engineers; and fall meeting of A.I.M.E.

September 3-13, 1952—Chicago. 100th anniversary conclave, American Society of Civil Engineers.

September 22-25, 1952—Denver. Metal and Nonmetallic Mineral Mining convention and exposition, American Mining Congress.

February 23-26, 1953—San Francisco. 37th annual convention, National Sand and Gravel Association. Hotel Fairmont.

February 23-26, 1953—San Francisco. 23rd annual convention, National Ready Mixed Concrete Association. Hotel Fairmont.

Sixth Grasslands Congress, First in United States, To Meet August 17-23

Plans are developing rapidly for the Sixth International Grasslands Congress, the first to be held in this country, which is being financed by private organizations.

Some 2,500 persons are expected to attend the Congress at State College, Pa., August 17th through 23rd, 1952. About 250 scientists and technicians in grassland farming, 100 of whom are from foreign countries, have been invited to present papers at these sessions. These dissertations will bring together a vast amount of the newest information and experimental data on grassland farming from all over the world. After all of this technical data is assimilated and thoroughly tested in the experiment stations and soils laboratories of this country, farmers should receive a great deal of information which can be put to practical use on their farms.

In addition to the technical papers, there will be educational exhibits pertaining to grassland agriculture. One of these will be a machinery exhibit and demonstration. Seedsmen, fertilizer manufacturers, and producers of agricultural liming material are also expected to attend and to make available information to aid in increasing grass and legume production. There will be four tours of several typical grassland areas.

19 Plants Receive Honors In Slag Assn. Safety Contest

At the mid-year meeting of the National Slag Association, scheduled for July 9 and 10 at the Book-Cadillac Hotel in Detroit, plaques will be presented to the winners of the Association's 1951 safety competition. According to reports from the U. S. Bureau of Mines, the following plants will receive top honors: The Fairfield Plant No. 5 of the Birmingham Slag Company for the Class A group; and the East Toledo plant of the France Stone Company for the Class B group. The plaques will be furnished by PIT AND QUARRY.

In addition to the two plants mentioned above, 17 other operations will be awarded Certificates of Safety Achievement for injury-free records.

April Construction Total Tops March and April, 1951 In Midwestern, Eastern U.S.

The 37 states east of the Rockies in April had construction contract awards aggregating $1,597,517,000, an increase of 21 percent over the March total and 16 percent more than in April, 1951. F. W. Dodge Corporation, construction news and marketing specialists, said the four-month 1952 total of $4,706,068,000 was 2 percent lower than the corresponding 1951 total.

Non-residential awards in April were $562,256,000, a gain of 21 percent over the figure for March and 9 percent more than in April a year ago. Residential contracts were up 16 percent from the March total and 15 percent above that of April, 1951, with a total of $681,-614,000. Public and private works and utilities at $353,647,000 were 33 percent higher than in March this year and in April, 1951.

Comparing the first four months of 1952 with the same period in 1951, the following percentages of difference were shown: non-residential awards, $1,684,-612,000, down 10 percent; residential, $2,008,490,000, down 5 percent; public and private works and utilities, $1,012,-966,000, up 22 percent.

Cement Plant Okayed For Acapulco, Mexico, Area

A commission of cement industry engineers has presented plans to the governor of the state of Guerrero, Mexico, for the construction of a cement plant 30 kilometers from the Pacific resort of Acapulco, on the highway leading to Mexico City. Investment in the new plant will be 8,000,000 pesos (approximately $925,900).

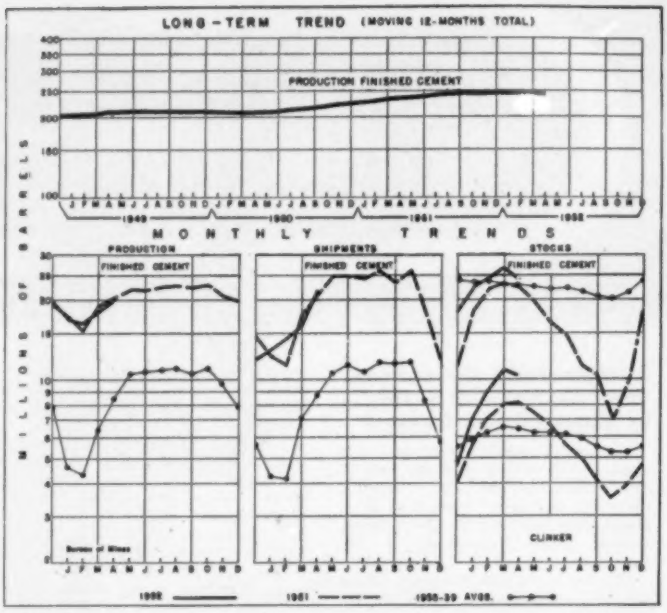
Governor Gómez Maganda has approved the project and has indicated that he is disposed to offer all facilities at his command to make it a success. This includes granting of land appropriate for the plant, important tax exemptions to stimulate advancement of production with lowest cost possible, and guarantees that the state government will aid in the development of the plant.

The main reason for the governor's interest is that a cement plant so close to Acapulco would have a notably beneficial effect on construction in the Pacific resort city, making cement available at "reasonable" prices and thus stimulating building construction, which is already booming in the resort.

Safety Contest Winners Announced by Natl. Lime Assn.

In the 1951 safety competition of the National Lime Association the following twelve lime plants were awarded Certificates of Honor for completing the year with perfect, no lost-time safety records:

Group A-1—Quarry and calcining plants working 100,000 or more man-hours: Natividad, Calif., plant, Kaiser Aluminum and Chemical Corporation; Luckey, Ohio, plant, National Gypsum Company; and Knoxville, Tenn., plant, Standard Lime and Stone Company.



SUMMARY—Production of finished portland cement in April, 1952, totaled 19,817,000 barrels, as reported to the U. S. Bureau of Mines—2 percent lower than the April, 1951, output. Mill shipments totaled 21,764,000 barrels—an increase of 4 percent, as compared to the preceding April, while stocks of 24,675,000 barrels of finished cement were 10 percent higher than at the same time a year ago. Clinker output during April was 4 percent lower than in April, 1951, and amounted to 19,596,000 barrels.

PRODUCTION—One hundred fifty-four (154) plants located in 37 states and in Puerto Rico produced 19,817,000 barrels of finished cement during the month, as compared to 151 plants which manufactured 20,184,000 barrels in April, 1951. As indicated above, clinker production declined 4 percent as compared to the same month in 1951.

SHIPMENTS—Mill shipments of finished cement increased 4 percent over the total reported for April, 1951. Shipments were greater in 12 districts and lower in 7 districts, as compared to those recorded for the previous April. Marked increases were noted in the Virginia-Georgia-Florida-Louisiana-South Carolina, the Iowa, and the Texas districts, while the declines were led by the Puerto Rico, the Ohio, and the eastern Missouri-Minnesota-South Dakota districts. California and the Pennsylvania producing districts showed little change, as compared to last year, while the New York-Maine district gained 14 percent.

STOCKS—Mill stocks of 24,675,000 barrels of finished cement were reported at the end of April, 1952—10 percent higher than a year ago, while stocks of clinker on April 30 amounted to 10,353,000 barrels—26 percent more than at the same time a year ago.

Group A-2—Quarry and calcining plants working less than 100,000 man-hours: Thomasville, Pa., plant, The J. E. Baker Company; McCoy, Pa., plant, The Warner Company; Ripplemead, Va., plant, Ripplemead Lime Company, Inc.; Frederick, Md., plant, Shank & Etzler Lime Company; and Valders, Wis., plant, Valders Lime and Stone Company.

Group B—Underground mine and calcining plants: Bellefonte, Pa., plant, The Warner Company; and Quincy, Ill., plant, Menke Stone & Lime Company.

Group C—Lime calcining plants without associated quarry and mine: Buffalo, N. Y., plant, The Kelley Island Lime & Transport Company; and Springfield, Mo., plant, Ash Grove Lime & Portland Cement Company.

The winning plants were announced and certificates were presented at the annual convention of N.L.A., which was held May 8-10 at the Homestead, Hot Springs, Va.

April Construction Volume For U. S. Sets New Record

New construction outlays throughout the United States rose seasonally in April to a total of nearly $2,500,000,000 setting a new record for the month, according to a joint report of the Building Materials Division, U. S. Department of Commerce and U. S. Labor Department's Bureau of Labor Statistics. The total value of new construction put in place during April was 8 percent above the March, 1952, total. Private outlays rose by 5 percent, and public expenditures increased by 12 percent over the totals of the previous month.

Construction activity has continued at a record rate for the country as a whole this year, even though some localities have experienced a drop because of declines in housing and commercial work. The dollar volume of new construction was greater during the first four months of 1952 than in any other similar period.

P. T. Lindhard, Famed As Cement Engineer, Dies After 50 Years in Industry

Paul T. Lindhard, formerly vice-president and chief engineer of F. L. Smidth & Co., New York, passed away on February 21 at the age of 80. Mr. Lindhard, who joined the Smidth organization in 1898, was regarded as one of the cement industry's foremost engineers.

He had an outstanding talent for invention, and during his lifetime took out more than 40 patents. He was

P. T. Lindhard

perhaps best known for his invention of the Lindhard Kominuter.

Early ball mills had openings in the grinding plates through which the ground material was discharged. Mr. Lindhard changed the design and patented a machine with solid grinding plates, the discharged material passing through openings at the outlet end, the oversize being returned to the mill for regrinding.

In the early days tube mills utilized flint pebbles as the grinding media. Mr. Lindhard patented the use of metallic grinding bodies in a compartment near the outlet end, retaining the flint pebbles in the first compartment, and thus increased the capacity of a tube mill on raw material about 100 percent, and on clinker about 50 percent, with only 25 percent increase in horsepower.

Another of Mr. Lindhard's inventions was a mill combining a ball mill and a tube mill in one unit, a forerunner of the present-day single mill with multiple compartments for both granulating and pulverizing. He also held many patents relating to pressure coolers, agitators, tube mill liners, water cooling of tube mills, multiple cooling cylinders around a kiln, and a great number of detail inventions.

Many of Mr. Lindhard's inventions were far ahead of the times, and a number of years passed before they came into general use. His work had an important influence on the whole development of manufacturing processes in the

G. Donald Kennedy, a new vice-president of P.C.A.

portland cement industry. At the time of his death he was a director of F. L. Smidth & Co.

The Minnesota Mining and Manufacturing Company, St. Paul, Minn., reported a net profit of $15,738,452 on sales of $170,067,527 in 1951, as compared with a net profit of $20,318,904 on sales of $152,806,313 for the preceding year.

Cover Picture....

• The cover picture this month is an aerial view of the new plant of the Marquette Cement Manufacturing Company at Brandon, Miss. A complete and well-illustrated article on this plant is a feature of the Cement Mills Section in this issue. This modern 2,000-bbl. plant is the first in Mississippi and extends Marquette's marketing area into a new territory. This plant has many notable features, including a raw-material preparation system especially designed for the complex raw materials found at this location. In this view the crusher building is at the left, the slip tanks and the grinding department are at the left of the storage building, the kiln and slurry silos are at the right, and the cement silos, the packhouse, and the bulk-loading facilities are in the background.

Kennedy, Allan Named P.C.A. Vice-Presidents At Los Angeles Meeting

Promotions for four staff members of the Portland Cement Association were announced by Smith W. Storey, chairman of the board of directors, after the Association's spring meeting in Los Angeles, May 19 to 21. The four elected to new positions are as follows:

G. Donald Kennedy, formerly assistant to the president and consulting engineer, was promoted to vice-president.

W. D. M. Allan, formerly director of promotion, was promoted to the post of vice-president for promotion.

Evelyn Pinkerton and J. L. Schneider were appointed assistant secretaries of the Association.

Mr. Kennedy joined the Association on January 1, 1950, after many years of wide and varied experience in the fields of structural, municipal, and highway engineering. A graduate of the University of Michigan, Mr. Kennedy served as state highway commissioner in Michigan and vice-president of the Automotive Safety Foundation before joining the Association.

Mr. Allan is a veteran of 33 years with the Association. Upon his graduation from Illinois State Teachers College, he joined the P.C.A. field promotion staff in 1918. Since that time he has served as manager of the Association's Cement Products Bureau, director of promotion, and secretary of the Association prior to his present appointment. He will retain his duties as secretary.

Miss Pinkerton is the first woman officer in the history of the Association. She joined the P.C.A. staff in 1933 and served for eight years as secretary to Frank T. Sheets, Association president, who died last November.

Mr. Schneider, who joined the Association in September, 1948, will continue his duties as publications editor of the advertising and publication bureau, in addition to his new responsibilities.

W. D. M. Allan, newly-named P.C.A. vice-president for promotion.

John Rice Sr., Pioneer Crushed Stone Producer, Passes Away at Age of 85

John Rice Sr., one of the founders of the General Crushed Stone Company, passed away at his home in Easton, Pa., on May 22, following a prolonged illness. He was 85. He is survived by two children, John Rice Jr. of Easton, vice-president of General Crushed Stone Co., and Mrs. Pinkney Love of Washington, D. C.

Mr. Rice was a graduate of the Sheffield Scientific School at Yale University. In 1899, after holding several important posts in the engineering field, he joined with the late Professor James Madison Porter and the late Harry Mitchell in founding the General Crushed Stone Co. He was the company's first vice-president, and in 1904 succeeded Professor Porter as president, continuing to serve in that capacity until 1931, when he became chairman of the board. He relinquished that post only last year to become honorary chairman.

Mr. Rice helped to found the National Crushed Stone Association; and in 1920 he served as president of that organization. Although he had wide business interests, he was perhaps best known in Easton as a civic leader and philanthropist. When difficult community projects were under consideration, more often than not his fellow citizens turned to John Rice for help; and he earned the reputation of being ready at all times to forego his personal interests in favor of a worthy cause. In 1949 he became the ninth recipient of the community's Golden Deeds award.

January-March Lime Output Totals Nearly 2,000,000 Tons

Domestic sales of open-market lime in January, 1952, were 662,641 short tons; in February, 642,787 short tons; and in March, 681,770 short tons. These totals were released by the U. S. Bureau of Mines.

Except for a small quantity (6 to 7 percent of the total reported herein) of captive tonnage included to maintain comparability with the annual lime statistics of the Bureau of Mines, the figures in this monthly series are limited to open-market lime. The monthly canvass includes the output of plants whose cumulative production in 1950 constituted 97 percent of the entire open-market lime industry. The accompanying table shows sales by types and major uses.

Edward J. Nunan to Head New York State Engineers

Edward J. Nunan, materials engineer and sales manager for New York State of the Buffalo Slag Co. and affiliated companies, took office on June first as president of the New York State Society of Professional Engineers.

Mr. Nunan has been active in the society's affairs for many years, serving most recently as first vice-president. He has also served as a zone director and as president of the Erie County chapter in Buffalo.

Edward J. Nunan

Lime Sold by Producers in the United States, January-March 1952, by Types and Major Uses, in Short Tons

	January	February	March	Total, 1st Quarter
By types:				
Quicklime	529,862	500,800	525,133	1,555,795
Hydrated lime	132,779	141,987	156,637	431,403
Total lime*	662,641	642,787	81,770	1,987,198
By uses:				
Agricultural:				
Quicklime	2,604	2,871	4,135	9,610
Hydrated lime	10,773	16,183	22,018	48,974
Total	13,347	19,054	26,153	58,584
Building:				
Quicklime	15,725	15,379	16,167	47,271
Hydrated lime	63,780	68,844	74,144	206,768
Total	79,505	84,223	90,311	254,039
Chemical and other industrial:				
Quicklime	335,729	317,125	325,927	978,781
Hydrated lime	58,226	56,960	60,475	175,661
Total	393,955	374,085	386,402	1,154,442
Refractory (dead-burned dolomite)	175,804	165,425	178,904	520,133

*Approximately 60 percent of lime produced is high calcium and 40 percent high magnesium.

Government Bodies Expect 1952 Construction Total To Reach New High Record

Outlays for new construction in 1952 are expected to set a new record of over $32,000,000,000, according to a statement released jointly by the Building Materials Division, U. S. Department of Commerce, and the U. S. Labor Department's Bureau of Labor Statistics. This will be about $1,000,000,000 more than the revised 1951 total, reflecting largely increased expenditures for military and atomic energy facilities. Private investment of over $21,000,000,000 in new construction will vary little from last year's total, but public outlays amounting to nearly $11,000,000,000 will represent an increase of $1,600,000,000 (17 percent over 1951).

The anticipated volume of new construction in 1952 is based on the assumptions that no major interruption will occur in the production of steel and copper products during the remainder of this year, and that partial relaxation of Regulation X will take place in the near future. Supplies of all nonmetallic building materials are expected generally to be adequate, as will the supply of construction labor in most localities.

Private residential outlays probably will be only a shade less in 1952 than in 1951. Home construction remained strong during the first part of this year under both materials and credit controls, and momentum will be provided during the latter half by relaxation in materials allocations, already announced, and by modifications in Regulation X. Although the total of 1952 private housing starts is expected to be somewhat greater than in 1951—about 1,050,000 compared with 1,020,100—the huge number of houses and apartments begun toward the end of 1950 placed more units actually under construction in 1951 than anticipated for 1952.

Expenditures for commercial and religious buildings will be off sharply as a result of restrictions affecting these types of construction during the first half of 1952. More liberal allotments of controlled materials for such projects beginning in the third quarter will permit some recovery toward the end of the year.

Somewhat more money will be spent by public utilities for new construction in 1952, particularly for electric power and telephone facilities and for petroleum pipelines. Expenditures for private industrial plants also will be up slightly over 1951 as the industrial expansion program which was begun last year is rounded out.

Public spending for atomic energy and defense plant construction is expected to exceed $1,600,000,000 in 1952, which will represent a rise of about 70 percent over 1951 outlays for such purposes. Expenditures for military installations probably will increase by about 85 percent to $1,900,000,000.

An expected increase in expenditures for public housing represents work started on an estimated 50,000 new public housing units this year, in addition to completion of work on units begun in 1951.

Executives Honored, Plant Expansions Okayed By Marquette's Board

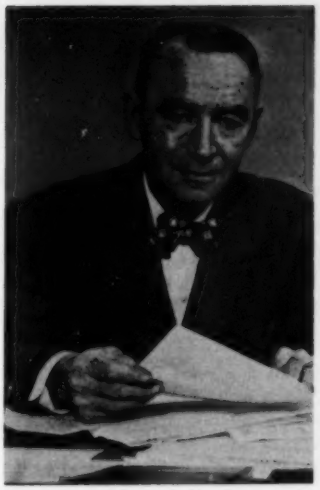
The board of directors of the Marquette Cement Manufacturing Company has announced the election of three new vice-presidents: V. J. Hanley, who is secretary-treasurer; L. W. Saxby, assistant to the president; and Frank Moyle, who serves as director of operations. Each of the men has been with the company at least 35 years.

Mr. Hanley joined Marquette in 1912 as a stenographer at its Oglesby, Ill., plant. After progressing through the timekeeping department there he was transferred to the accounting department in the company's Chicago general offices and, in 1932, was appointed assistant secretary. Subsequently he became secretary and assistant treasurer. In April, 1943, he was elected secretary and treasurer. He will now continue these duties under the title of vice-president.

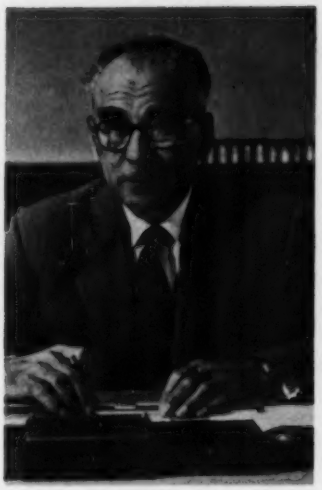
Leonard W. Saxby's service with the company dates back 43 years. He began as an office boy at the Oglesby plant in 1908. As the company grew, he progressed with it, and shortly after World War I he was made purchasing agent. In 1934 he was appointed assistant to the president, responsible for the co-ordination of all purchasing, operations, engineering and construction. As vice-president he will continue to devote his attention to these duties.

Frank Moyle is also a former Oglesby, Ill., resident who began with the struggling young company and with it rose to prominence in the industry. Son of one of Marquette's founders, the late Richard Moyle Sr., Frank Moyle trained for several years in various departments of the Oglesby plant before becoming a mill foreman there in 1917. Two years later he was made assistant superintendent and, in 1925, superintendent of the plant. In 1933 he became general superintendent of all Marquette plants. He was appointed director of operations in 1946, and will continue the duties of that office now as vice-president.

L. W. Saxby, assistant to the president.



V. J. Hanley, Marquette's new secretary-treasurer.



Frank Moyle, named director of operations for Marquette.

This action by the Marquette board increases the staff of company officers to nine. Stuart Duncan, president of the LaSalle State Bank, LaSalle, Ill., was re-elected chairman of the board; W. A. Wecker, president; D. S. Colburn, executive vice-president; W. W. Dickinson and S. L. Cribari, vice-presidents; and Paul Duncan, assistant secretary and assistant treasurer.

At a prior meeting the directors also approved the expenditure of an estimated $855,750 for additions, improvements, and replacements at the various plants, laboratories, and sales offices. Principal expenditures approved were for improvements in the dust collection facilities at the Oglesby, Ill., plant; for office and laboratory building alterations at the Cape Girardeau, Mo., plant to provide more space for foremen; for the purchase of certain additional quarry property needed in the company's expanded operations; and for the acquisition of four new barges for delivering cement to customers along the Mississippi River south of Memphis.

Major C. S. Comeaux Retires From Arms, Explosives Groups

Major C. Stewart Comeaux has retired, effective June 1, as executive secretary-treasurer of both the Sporting Arms and Ammunition Manufacturers' Institute and the Institute of the Makers of Explosives.

Major Comeaux assisted in organizing the latter group in 1913 and has served it since that time in his present capacity. After aiding in the establishment of the Sporting Arms and Ammunition Manufacturers' Institute in 1926, he was also appointed its secretary-treasurer.

He is regarded as the dean of living trade association secretaries, as his tenure of office with I.M.E. is believed to be the longest in the trade association field.

He was a reserve officer for nearly 30 years and was special assistant to the Chief of Ordnance during World War II while on a two-year leave of absence from his institute posts, and has devoted much of his personal time to the promotion of national defense.

Succeeding him as executive secretary-treasurer of the Institute of the Makers of Explosives and of the Sporting Arms and Ammunition Manufacturers' Institute will be Richard F. Webster, his assistant. Mr. Webster was public relations officer of the St. Louis Ordnance District during World War II and became associated with the institutes in 1947.

Major C. S. Comeaux, retiring executive of explosives and arms institutes.

Perlite Institute Meeting Held at Phoenix Attracts Members from 22 States

The Perlite Institute recently held its spring session at the Camelback Inn, Phoenix, Ariz. A total of 52 Institute members registered for the convention, representing 22 states.

It was most appropriate that the members convened in Arizona, for this state might properly be called the birthplace of commercial perlite mining and processing. It was in Arizona about ten years ago, that perlite was originally proven, and the first commercial mining operations took place at Superior, near Phoenix. A few pioneer perlite expanders decided to unite in setting up standards and specifications for the new material. Today, the Perlite Institute represents the bulk of the industry; it has made tremendous progress in assuring maximum standards of quality on the part of member producers.

The spring session was extremely important in that it served to introduce many members to the new Institute secretary, R. L. Davis. Mr. Davis brings to the Institute a valuable and successful background of executive engineering in various industries analogous to perlite.

In his opening address to the Institute, Mr. Davis praised the progress the industry has made in the few years of its existence and anticipated the great markets the industry will serve with its present program of quality, control, and tightened specifications. He commented further upon the recent successful fire tests using perlite-gypsum plaster, conducted by the Underwriters Laboratory.

One of the results of committee action was the Perlite certification program, which will assure the building professions that any bag of perlite containing the Perlite Institute insigne will comply with specifications laid down by A.S.T.M. and A.S.A.

The guest speaker at the convention was Arthur T. Roitt, executive manager of the California Lathing and Plastering Contractors' Association. Mr. Roitt discussed the amazing progress of perlite in the state of California, and heartily endorsed the perlite certification program as a safeguard for the contractor against inferior products, and as a means of obtaining the public's confidence by embracing only the highest standards in production and business ethics.

Gilmore Asphalt Products, Inc., Anna, Ill., which is located at the site of the Anna Quarries, Inc., has installed additional equipment adjacent to its plant. The new facilities are expected to produce at an hourly rate of 120 tons, supplementing the 180-ton hourly capacity of the original plant.

• The Institute's board of directors: Lewis Lloyd, New Orleans, La.; Bud Howell, Memphis, Tenn.; R. L. Davis (secretary), New York; A. A. Roitt (speaker), Los Angeles; John Brouk (president), St. Louis, Mo.; Donald Gott, New York; and Jack Kingsbury, Joliet, Ill. K. E. Haselton (vice-president) is not in the picture.

• Left to right: Foster Bartlett, Milwaukee, Wis.; Robert Dowse, Oconomowoc, Wis.; P. E. Lipscomb, Midland, Tex.; and H. H. Ellerbeck, Salt Lake City.

Joseph A. Holmes Awards Announced by J. J. Forbes For Top Safety Records

J. J. Forbes, director of the U. S. Bureau of Mines and president of the Joseph A. Holmes Safety Association, has announced that a total of 416 awards were made by the Association for exceptional safety records and outstanding success in supervisory work in the year just past. Certificates of Honor were awarded to 159 individuals, 11 cement plants and quarries, 6 nonmetallic mines and companies, 98 coal mines and companies, 77 metal mines, 53 petroleum plants, and 4 miscellaneous operations. Eight persons received Medals of Honor for deeds of heroism in mines and plants.

In Region III Certificates of Honor were awarded to the Natividad plant and quarry of the Kaiser Aluminum and Chemical Corporation at Permanente, Calif. In Region IV the Western Gypsum Company at Sigurd, Utah, and the mine and refinery of the Potash Company of America were honored; and in Region VI The Texas Gulf Sulphur Company, Newgulf, Tex., received a certificate.

Individuals receiving Certificates of Honor in Region VII were as follows: J. A. Horton, maintenance foreman, Tennessee Coal and Iron Division, United States Steel Company, Bessemer, Ala., for supervising the electrical and mechanical maintenance of two underground ore mines and one limestone mine from September 18, 1947, through December 31, 1951, and continuing, a total of 604,250 man-hours, without a lost-time accident.

R. E. Towers, quarry foreman, Tennessee Coal and Iron Division, United States Steel Co., Bessemer, Ala., for supervising the operation of a dolomite quarry from October 1, 1950, through December 31, 1951, and continuing, a total of 358,015 man-hours, without a lost-time accident.

E. S. Whitmire, packhouse foreman, Volunteer Portland Cement Company, Knoxville, Tenn., for supervising the packing and shipping of cement without a lost-time accident from April 5, 1951, to December 31, 1951, a total of 403,900 man-hours.

The following plants and quarries were also awarded Certificates in Region VII: cement quarry, and Georgia No. 2 plant, both of the Penn-Dixie Cement Corporation, Clinchfield, Ga.; No. 5 limestone mine and Dolonah quarry, both of the Tennessee Coal and Iron Division, United States Steel Co., Bessemer, Ala.; Bonny Lake mine and Pauway No. 4 mine, both of the Phosphate Rock Division, The Davison Chemical Company, Bartow, Fla.; and the Florida Phosphate Division, International Minerals and Chemical Corporation, Bartow, Fla.

In Region VIII the following individuals were honored: John Cemate, Michigan Limestone Division, United States Steel Corp., Boyers, Pa., for working in an underground limestone mine for 44 years and 5 months without a lost-time accident.

Robert M. Everhart Sr., maintenance foreman, The Standard Lime and Stone

(*Continued on page* 81)

30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

THE July, 1922, issue of PIT AND QUARRY, while not so designated, was primarily a sand-and-gravel dredging and pumping number. The feature plant article described the new $150,000 hydraulic dredge and crushing and screening plant of the Belmont Sand & Gravel Company at Belmont, Mich. Also featured was the new all-steel electric ladder dredge "Allegheny" of the J. K. Davison & Bros. Sand Company of Pittsburgh, Pa., built at a cost of $350,000. Another large new river dredge described was built by the Bucyrus Company for the Iron City Sand Company of Pittsburgh. This had a capacity of about 150,000 cu. yd. per month. The smaller sand-and-gravel dredge and plant of the Roanoke Washed Sand Corporation, Roanoke, Va., was also described and illustrated.

Pumps for Stripping was a staff-written article describing the advantages of hydraulicking under certain conditions. Much important advice on methods and equipment was included.

Dredgers and Boosters in Duplicate was the title given by Victor J. Mill, then dredge engineer for the Morris Machine Works, to his description of the operations of the Ward Sand & Gravel Company at Oxford, Mich. This was a large and efficient plant, but the feature was the dredge, designed to eliminate any possibility of shutdowns. Because pumping was to be done for distances up to 3,000 ft., 15-in. dredge and booster pumps were used on the line. The insurance against loss of production was the installation of a duplicate set of pumps with a separate line to the plant.

Another feature of this issue was a complete report of the fourth annual convention of the National Lime Association, held in Cleveland on June 14, 15, and 16. Over 100 producers were present to make this the largest convention to date, and the program made it the best. Papers presented included a description of the new plant of the Rockland & Rockport Corporation's lime plant; *Lime Burning in Rotary Kilns* by Irving Warner (The Warner Company); the use of lime in the manufacture of sulphide paper pulp; the use of lime in glass manufacture; the use of lime for water softening, by Sam C. Hadden, then editor of *Municipal and County Engineering;* a description of the many special types of lime made by the Allwood Lime Company, by Mary E. Squire, head of that company; the use of lime in textile manufacture; mechanization in the lime industry, by H. D. Pratt of the Link-Belt Company; *A new Idea in Lime Barrels,* by the late James H. McNamara of the Eagle Rock Lime Company; services of the U. S. Bureau of Mines to quarry operators, by Oliver Bowles; the effect of lime in concrete; the use of lime in the chemical industries; a method for more rapid slaking of lime; lime for crop protection; and many others.

On the opening day there was an address by the Hon. Newton D. Baker, former Secretary of War, who described the importance and activities of trade associations. Officers re-elected for a second year were: Charles Warner (The Warner Company), president; George J. Nicholson (White Marble Lime Company), vice-president; and W. R. Phillips, secretary-manager. Milton McDermott (Knoxville Sand & Gravel Company), was chosen the new treasurer. In this issue also was a biography of Mr. Phillips, who had taken over his duties on May 16.

One of the papers presented at the N.L.A. convention, *What I Have Found Out About Lime,* by F. C. Mathers, professor of inorganic chemistry at the University of Indiana, was reprinted in full. Mr. Mathers briefly summarized the most important results of the researches on lime being made under an N.L.A. fellowship at the university.

There were many interesting items in the news. The Charles Warner Company had acquired a large interest in, and assumed management of the American Lime & Stone Company at Bellefonte, Pa. The Hermitage Portland Cement Company, Nashville, Tenn., was reported to have completed plans for a 2,000-bbl. per day addition to its plant. The plant of the Canada Crushed Stone Company, Dundas, Ont., was reported almost entirely destroyed by fire.

Joseph A. Holmes Awards

(*From page* 80)

Company, Martinsburg, W. Va., for supervising the maintenance crews without a lost-time accident up to January 1, 1952, a total of 885,188 man-hours.

Nicola Liberatore, Michigan Limestone Division, United States Steel Corp., Boyers, Pa., for working in an underground limestone mine for 49 years and 7 months without a lost-time accident.

Salvador Macaluso, The Bessemer Limestone and Cement Company, Bessemer, Pa., for supervising a crew of 29 men in the packing and shipping of over 14,000,000 barrels of cement from January 1, 1942, to January 1, 1952, a total of 695,090 man hours, without a lost-time accident.

Peter J. Matla, United States Gypsum Company, Oakfield, N. Y., for working in the gypsum mines of New York for more than 45 years without a lost-time accident.

Guiseppi Pezzuti, mine foreman, Michigan Limestone Division, United States Steel Corp., East Brady, Pa., for supervising the operation of the Kaylor mine, an underground limestone mine, without a lost-time accident, from November 14, 1950, to March 1, 1952, and continuing, a total of 409,395 man-hours for 170 employees.

James Rossi, Michigan Limestone Division, United States Steel Corp., Boyers, Pa., for working in and around an underground limestone mine for 38 years and 7 months without a lost-time accident.

Plants and quarries of Region VIII winning the Certificate were as follows: Bessemer limestone quarry, The Bessemer Limestone and Cement Co., Bessemer, Pa.; Annandale plant, Boyers, Pa., and Kaylor plant, East Brady, Pa., both of the Michigan Limestone Division, United States Steel Corp.; Plant No. 9, Penn-Dixie Cement Corp., West Winfield, Pa.; Bell mine and plant, The Warner Company, Bellefonte, Pa.; and the operation of the American Cyanamid Company at Brewster, Pa.

Ideal's Plant at Boettcher Celebrates Triple Event

April 8, 1952, was a red-letter day for the employees of the Ideal Cement Company at its Boettcher plant, who marked 1,000 days without a lost-time accident, attended the Portland Cement Association's safety trophy dedication, and celebrated the 100th birthday of the firm's late founder, Charles Boettcher.

During the afternoon, in a typical Colorado blizzard, formal ceremonies were held to dedicate the 10-ton Portland Cement Association safety trophy. Later, at the evening festivities, Ideal's President Cris Dobbins presented the Charles Boettcher Annual Safety Award to Joseph Price, plant safety supervisor. It was the second consecutive year this plant had won the honor.

At this time the 1,000-day Certificate Award was presented by Claude Farmer of the Portland Cement Association.

YOU MAY BE NEXT!

A man who calls himself Thomas Ryan is defrauding operators of non-metallic minerals plants by representing himself as a subscription salesman for this publication. One of the victims describes him as follows: around 45 years of age, 5 ft. 7 in. in height, weight about 130 lb., florid complexion, teeth and fingers of right hand badly stained with tobacco, lower teeth widely spaced.

If a man answering this general description calls on you for the purpose of selling or renewing a subscription to Pit and Quarry, please notify local police at once and advise this publication's home office by collect telegram or long-distance telephone.—The Editors

Kaiser Expands Gypsum Board Plant At Redwood City, Acquired in 1949

This view from the edge of the Kaiser Gypsum Division's quarry on tropical San Marcos Island shows the long belt conveyor which loads the gypsum rock into cargo ships.

By HARRY F. UTLEY

another ON THE SPOT report

CAPACITY to produce an additional 150,000 sq. ft. of board products per day was taken over by the Gypsum Division of the Henry J. Kaiser Company in October, 1949, when it acquired the necessary manufacturing facilities at Redwood City, Calif. This plant, built in 1941 by the Pacific Portland Cement Company on the waterfront, was the second gypsum operation to come under Kaiser ownership in the post-World War II era, the initial step having been taken in 1946, when the Gypsum Division was formed and the Long Beach facilities of the Standard Gypsum Co. became a Kaiser enterprise.

Immediate steps were taken to improve and expand the Redwood City operation with the result that by 1950 the original 150,000-sq. ft. capacity had been increased to 225,000 sq. ft. per day. This 50 percent gain in output was accomplished with the minimum of added equipment, and involved principally a speed-up in drying time by augmenting the supply of heat to the dryer, and the installation of a third Raymond Imp mill to increase grinding and calcining capacity. The Redwood City plant, with one exception, is the only gypsum-products plant in the country which does not employ kettles to calcine the raw gypsum, a suitable stucco for board production being produced by flash calcination in the Imp mills.

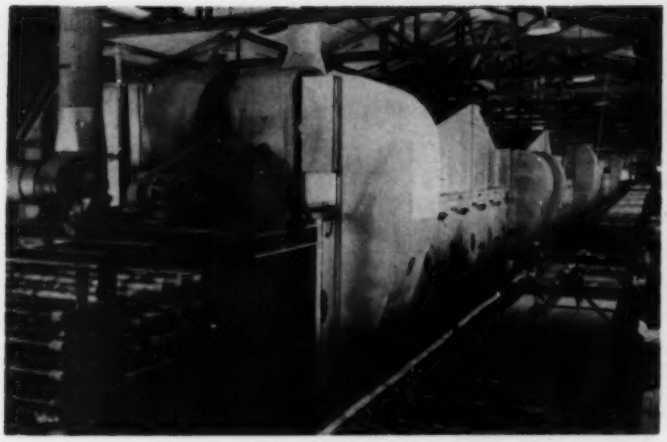
Raw material for both the Redwood City and Long Beach plants is quarried and crushed at extensive deposits of high-grade rock on San Marcos Island in the Gulf of California, and is brought in by Kaiser-owned self-unloading vessels. Formerly, the *Permanente Silverbow* engaged in this service, doubling also as a cement carrier. In 1950, however, the self-unloader *Harry Lundeberg*, a converted Liberty ship, took over the gypsum run. This vessel has a cargo-carrying capacity of 10,000 tons. At Redwood City the ship unloads *via* scrapers in the hold and conveyors, to open storage at dockside. Recovery is by a Trackson D4 loader and trucks, and the material, having previously been broken to 4-in. top size at San Marcos, is delivered to a secondary jaw-crusher set at about 1 in. The product is conveyed, then elevated to feed bins with a total capacity of 275 tons and situated above the three Raymond No. 50 Imp mills.

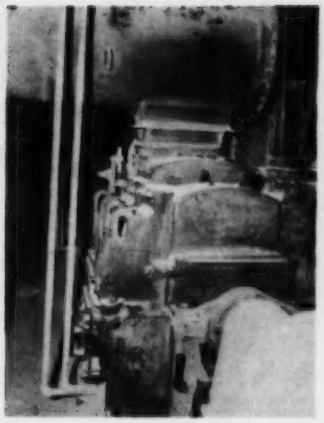
The Raymond mills are fired by separate oil furnaces to develop temperatures of 1,300 to 1,400 deg. F. within the mills during the grinding process for flash calcination. At the same time the hammers pulverize the material to a fineness of 85 to 95 percent through 100-mesh with closed-circuit air separation. Thermocouples sense the temperatures at inlet and outlet at the mills, and these are recorded and controlled to within 10 degrees of 330 at the exhaust end by a Brown Electronik 6-point strip recorder. Finished stucco is then elevated to three storage bins holding 290 tons, with cyclone dust collectors in the circuit

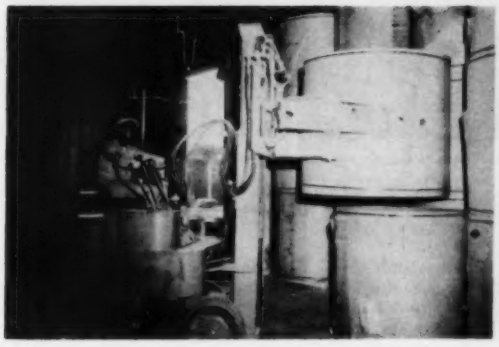
The board machine is a typical Ehrsam installation which has become standard throughout the gypsum industry. Drag chains convey the stucco, sawdust, and other additives to the pin-type mixer at the

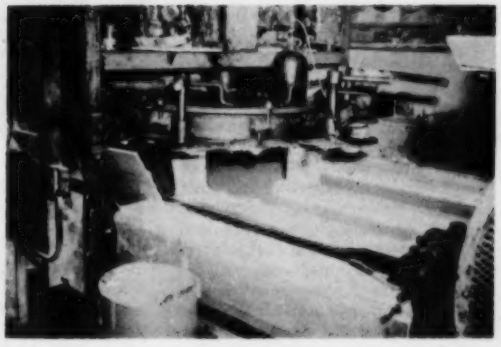
(*Continued on page* 90)

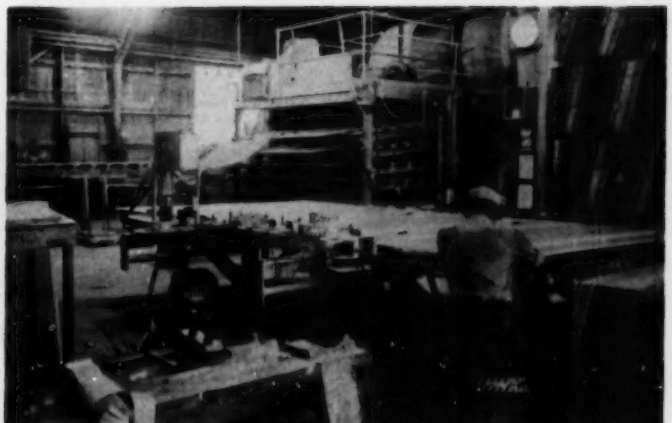
The fourth kettle and the new roller mill being installed at the Long Beach plant.











Top, left: This photograph of the three-zone steam dryer and the board machine was taken before the recent expansion of the plant.

Top, right: One of the three mills which grind and calcine the raw gypsum.

Center, left: A grab-lift truck makes handling of the heavy rolls of paper an easy task.

Center, right: The mixer depositing wet plaster on paper at the head end of the board machine.

Bottom, left: The propane gas heater installation above the board machine provides extra heat for rapid drying of the product in the dryer.

Bottom, right: Board edges are tape-sealed after being dried.

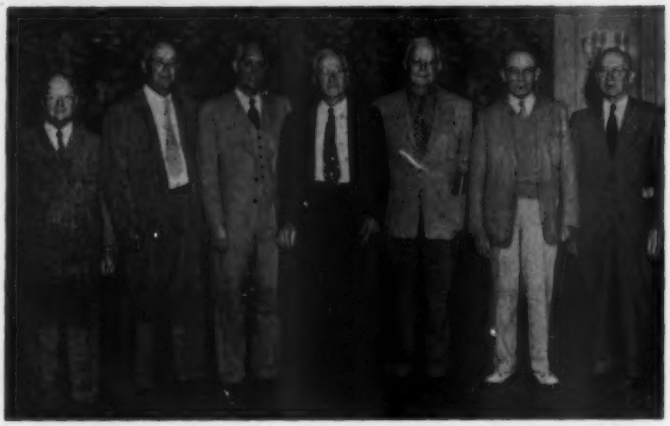
National Lime Association Celebrates Golden Jubilee At Annual Meeting

THE National Lime Association celebrated its Golden Jubilee at its 50th Annual Convention, held at The Homestead, Hot Springs, Va., on May 8, 9 and 10, 1952. It was only fitting that the attendance should set a record, due in part to

By WALTER E. TRAUFFER

the number of pioneer members who had not been attending regularly in recent years but who were there to help celebrate this memorable occasion. As was to be expected, much of the program leaned toward the nostalgic, especially a playlet based on the early days of the Association. The regular program was not slighted, however, and the subject matter discussed was timely and varied, covering many subjects of interest to lime producers, ranging from Association business to research and government activities. There were, as usual, a number of outstanding speakers, both from within and without the industry, and ample opportunity was given the members to ask questions and discuss their mutual or individual problems.

Even more than the usual number of those attending brought their wives, total attendance being 151, including 56 ladies; the former is a record since 1925 and the latter an all-time record. The entertainment and social angles of the meeting were as usual well planned and included, in addition to the regular recreational features of this famous resort, cocktail parties, bingo games, and the annual reception and banquet, followed by entertainment and dancing.



Some of the "old-timers" who attended this convention (left to right): Henry LaLiberte (Cutler-Magner Co.); Chauncey C. Loomis (New England Lime Co.); Wallace E. Wing (Marblehead Lime Co.), president; Charles Warner and Irving Warner (The Warner Co.); S. Walter Stauffer, former general manager of N.L.A.; and Fred Witmer (Ohio Hydrate & Supply Co.).

President's Address In his welcoming address, Wallace E. Wing, president and chairman of the board of directors, emphasized the importance of the occasion and expressed gratification over the attendance. He pointed out that when N.L.A. was founded in 1902, there were only about 100 trade associations in this country. Now there are over 17,000, about 1,600 of which are national in scope. The greatest expansion, he stated,

The annual banquet, a gala affair, held on the first night of the convention.

The cast of the sketch depicting an early directors' meeting (left to right): John F. Gruber (St. Regis Sales Corp.); Frank Witmer (Ohio Hydrate & Supply Co.); David K. Shroyer (H. E. Millard Lime & Stone Co.); Kent Jander (N.L.A.); and James S. Offut (United States Gypsum Co.). Another member of the cast, Alan B. Cheney (Cheney Lime & Cement Co.), is not in the picture.

has taken place in the last 20 years as the growing complexity of business and government made the services of such bodies more important. He emphasized the value of an active association to an industry, pointing out a few of the innumerable things N.L.A. has accomplished for its members and for the entire lime industry. The work done by the Association on percentage depletion, he said, is outstanding; but continued effort will be necessary to keep the benefits obtained.

Officers and Directors In recognition of the outstanding work he has done for the Association Wallace E. Wing (Marblehead Lime Company) was re-elected president for a third year. Paul Sunderland (Ash Grove Lime & Portland Cement Company) was elected treasurer. Robert S. Boynton was re-elected general manager, and Miss Gladys L. McBee, secretary.

The board of directors for the coming year is composed of the following: District 1—C. C. Loomis (New England Lime Co.); District 2—Bolton L. Corson (G. & W. H. Corson, Inc.), E. D. Williams (H. E. Millard Lime & Stone Co.), and J. P. Feiser (LeGore Lime Co.); District 3—Reed C. Bye (Warner Co.), F. J. Collins (The Kelley Island Lime & Transport Co.), and Amos B. Miner (National Gypsum Co.); District 4—J. A. Dunaway (Peery Lime Co.); District 5A—Fred Witmer (Ohio Hydrate & Supply Co.); District 5B—Charles E. Rarey (The Marble Cliff Quarries Co.); District 6—L. N. Carmouche (The Dow Chemical Co.); District 7—Robert F. Mathews (Mississippi Lime Co.) and Wallace E. Wing (Marblehead Lime Co.); District 8—Michael Brisch (Rockwell Lime Co.); District 9—Henry LaLiberte (Cutler-Magner Co.); Districts 10 and 11—K. L. Hammond (Keystone Lime Works, Inc.); District 12—Paul Sunderland (Ash Grove Lime & Portland Cement Co.); District 13—George E. Robinson (Austin White Lime Co.); District 14—Mrs. Ada M. McMillin (Roche Harbor Lime & Cement Co.); and District 15—T. R. Ellerbeck (Utah Lime & Stone Co.)

The executive committee consists of Messrs. Wing (chairman), Bye, Corson, Ralph Dickey, C. C. Loomis, Hammond, and Miner.

General Manager's Report Robert S. Boynton, general manager of the Association, in his annual report on N.L.A. activities, pointed out that the future for the lime industry looks favorable and that, in spite of huge expenditures for new production facilities in recent years, the industry does not seem to be overexpanded. He stressed the importance to the industry of percentage depletion and said that the excess profits tax concession on excess production is also a boon.

Mr. Boynton briefly described the work being done at various universities for the Association. There are now two fellowships on trade wastes research, the original one at Rutgers covering a broad field and the year-old one at Purdue concentrating chiefly on oil. There have as yet been no sensational developments in either fellowships, but much fundamental and marketing information on lime is being developed. Mr. Boynton expressed his belief that the trade waste field would eventually be a larger market for lime than water treatment.

The lime-soil stabilization fellowship at Purdue, Mr. Boynton announced has produced some very important information. He mentioned a trial road to be built near Beaumont, Tex., which will use pulverized quicklime instead of hydrate. An eastern producer, he said, has interested several eastern states in the use of lime and fly ash stabilization, and this combination has proved to be very effective. Mr. Boynton also mentioned the Toledo Research Foundation's research on autoclaved concrete products which shows possibilities for lime if used with some pozzolan material such as fly ash, pumice, etc. He also told of the many publications and letters the staff has gotten out for its members and to promote the wider use of lime. In closing, he said that the Association is now in the soundest financial condition in its history and that it represents at least 95 percent of the total production of lime.

Safety Competition Kent Jander of the Association reported the results of the safety contest. This competition, he said, started in NRA days and is now 17 years old. Nine plants in the industry have been entered for that entire period, and a total of 154 safety certificates have been awarded for perfect safety records. In the first year of the contest, he said, nine plants had perfect records, but the accident record of the industry as a whole was bad. There are now 40 to 45 plants enrolled in the contest every year, and the record is improving steadily. Mr. Jander warned producers of the growing emphasis on safety everywhere and the possibility of government action and said that present records could still be much improved.

Twelve lime plants had no lost-time accidents during 1951 and were awarded Certificates of Honor. They are:

Group A1—quarry and calcining plants working 100,000 or more man hours: Natividad (Calif.) plant of Kaiser Aluminum & Chemical Corp.; Luckey (Ohio) plant of National Gypsum Co.; Knoxville (Tenn.) plant of Standard Lime & Stone Co.

Group A2—quarry and calcining plants working less than 100,000 man hours: McCoy (Pa.) plant of The Warner Co.; Thomasville (Pa.) plant of the J. E. Baker Co.; Ripplemead (Va.) plant of the Ripplemead Lime Co.; Frederick (Md.) plant of the Shank & Etzler Lime

Co.; and Valders (Wis.) plant of the Valders Lime & Stone Co.

Group B—underground mine and calcining plants: Bellefonte (Pa.) plant of the Warner Co.; Quincy (Ill.) plant of the Menke Stone & Lime Co.

Group C—lime calcining plants without associated quarry or mine: Buffalo (N.Y.) plant of the Kelley Island Lime & Transport Co.; Springfield (Mo.) plant of the Ash Grove Lime & Portland Cement Co.

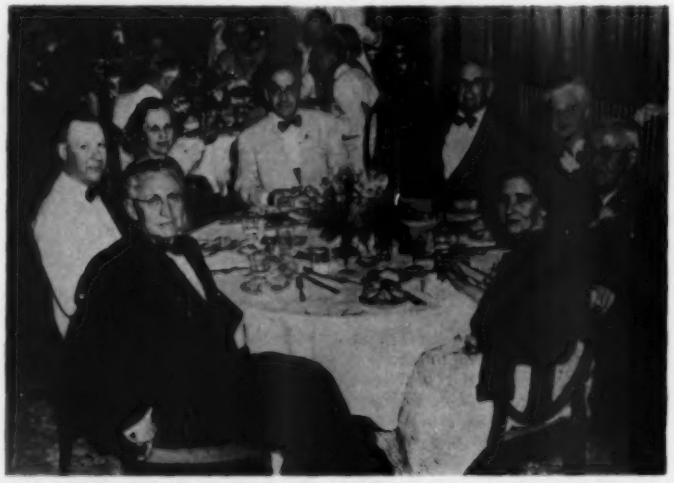
Operating Meeting At one of these sessions a brief review was given of the plans for the next Operating Meeting, which is to be held at the Mountain Lake Hotel, Mountain Lake, Va., September 15-17, 1952. This will apparently be as good a meeting as any of the other very successful ones which have been held. Every member should attend, along with his top operating personnel. Special features will be visits to two outstanding rotary kiln plants at nearby Kimballton.

Historic A good part of the opening day's session was devoted to reminiscences and reviews of the past in the industry and the Association. Charles Warner. (The Warner Co.), dean of the lime industry and one of the founders of the Association, told of the meeting of a group of six lime manufacturers in 1902 which resulted in the formation of the Association. Nathan C. Rockwood (*Rock Products*) also reminisced on the early days of the industry. George B. Wood (Rockland & Rockport Lime Corp.), who had also been scheduled to speak, was unable to attend.

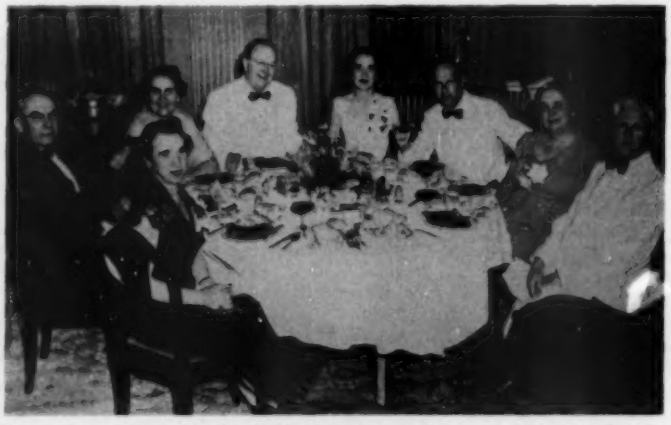
The next feature on the program was a playlet, "Struggles of Infancy", written by Mr. Rockwood, with Edward I. Williams (Riverton Lime & Stone Co.) as narrator and a cast composed of convention regulars. The scene portrayed was an early board of directors meeting. It was as serious as could be expected with the following cast: Franklin Witmer as A. Newton (Marblehead Lime Co.); John F. Gruber as Peter Martin (Tri-State Supply Co.), a testy, domineering character; David K. Schroyer as Charles Weiler (Western Lime Co.), a foresighted producer who believed in consolidation within the industry; James S. Offutt as Col. C. W. S. Cobb (Glencoe Lime & Cement Co.); Alan B. Cheney as William E. Carson (Riverton Lime & Stone Co.); and Kent Jander as an anonymous character. Kent Jander also doubled as makeup artist. Some of the parts were slightly hammed up, and some liberties were taken with the script but the acting was good, the costumes were realistic, and the audience enjoyed it all immensely.

Price Control An informal open forum on government price control was led by Walter H. Acheson, chief, Building Materials Branch, OPS. He opened by saying that conditions with respect to prices must be better in the lime industry than in many others as few complaints have been received from lime producers. He explained that the earnings standard of OPS entitles an industry to earn not less than 85 percent of its 1936-9 earnings and that this is a yardstick, not a rollback formula. The lime industry advisory committee, Mr. Acheson, pointed out, has never found it necessary to meet. He stated that the industry must demonstrate whether or not it can absorb increased freight rates, and it is hoped that some adjustment can be made for both shippers and resellers.

In answer to questions, Mr. Acheson said that when decontrol of an industry is suggested, the first requirement is that there be an oversupply of its products. The second consideration is that there be no



At this table (left to right) are: Robert C. Collins and John M. Junkin (The Warner Co.); Mr. and Mrs. John F. Gruber (St. Regis Sales Corp); Mr. and Mrs. J. P. Feiser (LeGore Lime Co.); Charles Warner (The Warner Co.); and Mrs. Junkin.



Mrs. William A. Wilson; S. Walter Stauffer, former general manager of N.L.A.; Mrs. Frank S. White; Mr. and Mrs. K. L. Hammond (Keystone Lime Works, Inc.); Mr. and Mrs. S. Colton Snead; and William A. Wilson (Pit and Quarry).

possibility of having to reimpose controls in the near future. He indicated that there is some over supply of chemical lime but not of some other types.

MRO-Mining Equipment Outlook The Outlook for Mining Equipment and MRO was the subject of Harold A. Montag, director of the Mining Requirements Division of DMPA, an executive of the Joy Manufacturing Co. on loan to the government, as he was also during World War II. He said that existing controls are basically the same as they were in the last war, but that their applications vary. For example, M78 is more liberal than P56. This body, said Mr. Montag, was formed in 1950 in order to strengthen the defenses of the United States. We demobilized too fast after World War II, and we have a long way to go to get back into a strong enough position to stop the spread of Communism. Efforts are being made to do the job without serious dislocation of industry and without creating unnecessary shortages. According to Mr. Montag, much of the important work is done or near completion and everything possible will be decontrolled as soon as it becomes readily available on the open market. In addition the DMPA is trying to set up procedures which are not only usable now but which can be reapplied at some future date if this should become necessary.

Mrs. Robert F. Mathews; John S. Schirm (Grand Canyon Lime & Cement Co.); Mr. and Mrs. V. R. Koenig (Mississippi Lime Co.); Robert S. Boynton, general manager of N.L.A.; Burton A. Ford (St. Regis Sales Corp.); Mrs. Boynton; and Robert F. Mathews (Mississippi Lime Co.).

Mrs. Walter H. Acheson; Russell Rarey (Marble Cliff Quarries Co.); J. F. McDonnell and J. L. Skelley (Linwood Stone Products Co.); R. M. Mathieson (Aluminum Co. of Canada, Ltd.); Mrs. Russell Rarey; and Walter H. Acheson (Office of Price Stabilization).

Percentage Depletion The latest developments on percentage depletion were described by J. Milton Cooper, legal counsel for the Association. It will, he said, be at least three to six months before the proposed regulations for percentage depletion will be available; and it may be two years before we know the entire groundwork under which we must operate. In the meantime, he advised that everyone go ahead in the light of present knowledge. He described the four years' efforts of the Association's percentage depletion committee and praised the work its members had done. They had asked for an end-use definition, but the grade definition was decided on. In answer to questions, Mr. Cooper stated that where two definitions conflict, the more limited and specific one holds, for example dolomitic chemical and metallurgical stone should take the 15 rather than the 10 percent allowance. He also commented on the unfairness of the present ruling to certain producers operating on a fiscal instead of a calendar year, some of whom may lose as much as 11 months' benefits. Moves are now under way to correct this inequality. He also suggested that unless state laws provide against it, producers should investigate whether or not they may take percentage depletion on their state taxes.

Mr. Cooper emphasized the fact that Congress is the only means of getting government back into the hands of the people, who should know more about procedures followed in the making of laws. Congressmen get many letters from labor and the people, but seldom any from businessmen; and they base their opinions of public demand largely on what they hear. He then described in considerable detail the major congressional committees and their functions and the devious path a bill must follow before it becomes a law.

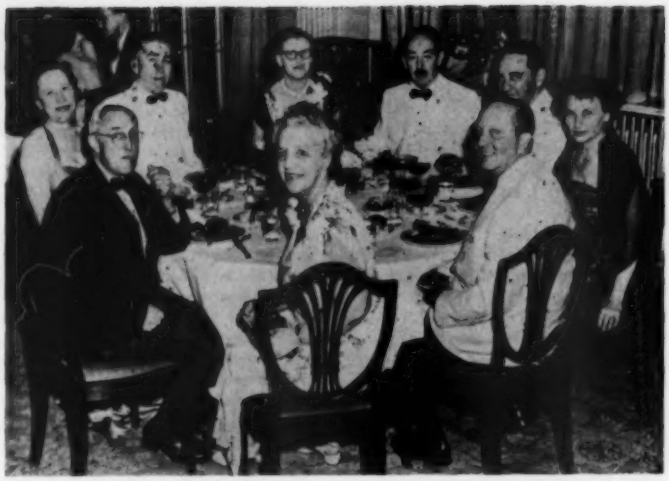
Mr. Cooper stated that a bill can be introduced either in the House or the Senate, except that tax bills must start in the House. There the bill goes into the hopper and is then referred by the Speaker to the proper committee. The committee chairman gets advice from the proper bureau of the government—the Treasury in the case of tax bills—and the chairman then calls a public hearing. This is followed by an executive closed session of the committee and government department experts. Reports

and amendments are then filed and the bill is referred to the House rules committee. After debate and amendment the bill is passed on to the Senate, where the proper committee and a similar executive session consider it before it goes to the Senate floor. Amendments are there made if necessary; and if amended, the bill goes back to the House. If the Senate makes no amendments, a joint committee of both houses considers the bill and any differences are adjusted or compromised. The speakers of both houses finally sign the bill and send it on to the President for his signature, with which it then becomes law. If the President vetoes the bill, a ⅔ vote in each house is required to pass it over his veto.

Four Buckets of Paint The closing address of the second day's meeting was given by a speaker who kept everyone in his seat until the conclusion. He was Dr. Kenneth McFarland of Topeka, Kans., one of the foremost American educators and a noted lecturer and speaker. In his talk, *Four Buckets of Paint*, he interspersed sound and intelligent thought with humor in a way that won and kept his hearers' attention. He said that there has never been a time when we and our leadership have been so confused; the meetings we now hold are not so much to develop new things and ideas as to straighten out our ideas and thinking on what we have. We are frustrated because we cannot solve our problems.

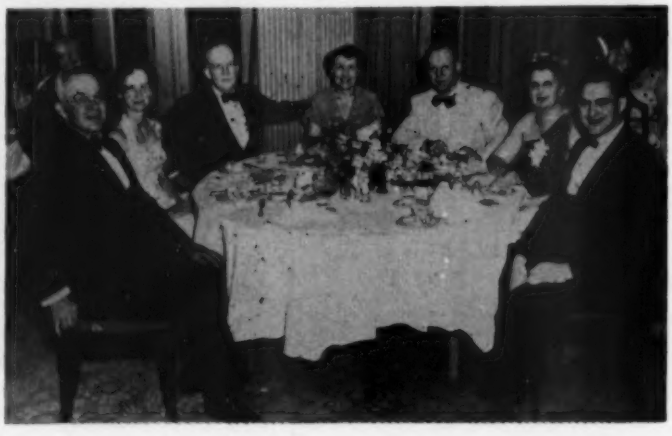
The present crisis, Dr. McFarland admitted, is not Pearl Harbor again, but it is serious. Of our present 154,000,000 population about 20,000,000 are under 6 years of age, and it will be many years before an increase in population will help our production or our armed forces. According to Dr. McFarland, we are now drawing on our depression baby crop, which was very thin; and this situation, added to the fact that we have 1,500,000 unemployed and 1,000,000 unemployable, is the cause of our manpower shortage.

On the brighter side, the speaker pointed out that we can now produce twice as much as in 1942. Then there was a production line for Cadillacs; and when the tanks went on, the cars came off. Now we have a line for each—it is now guns *and*



Mr. and Mrs. John C. Best (National Gypsum Co.); Mr. and Mrs. James S. Offutt (United Gypsum Co.); Mrs. Amos B. Miner; H. D. Brigstocke (Thomasville Stone & Lime Co.); Amos B. Miner (National Gypsum Co.); Mrs. H. D. Brigstocke; and Edward I. Williams (Riverton Lime & Stone Co.).

Mrs. J. Milton Cooper; Wallace E. Wing (Marblehead Lime Co.); J. Milton Cooper; H. D. Willington (International Paper Co.); Mr. and Mrs. Lester Crown (Marblehead Lime Co.); Ralph L. Dickey (Kelley Island Lime & Transport Co.); Mrs. Wallace E. Wing; and Irving Crown (Marblehead Lime Co.).



Mr. and Mrs. Harry W. LeGore (LeGore Lime Co.); Mr. and Mrs. Robert S. Walker (Traylor Engineering & Manufacturing Co.); Mr. and Mrs. G. I. Purnell (The Warner Co.); and Kent Jander (N.L.A.).

C. R. Atherton (Atherton & Evans); Mrs. Walter Scherping; Irving Warner (The Warner Co.); Mrs. Michael Brisch; Dr. Walter Scherping; Michael Brisch (Rockwell Lime Co.); and Walter E. Trauffer (Pit and Quarry).

butter. He pointed out that never before have we built up a war force in peacetime; and we are building it so that we won't have to use it. Too many of us, however, are in a very narrow rut in our thinking. We are so far from reality that we resent our employer's having enough money to pay us. Too many of us want others to do the hard, dirty work. We are dangerously cynical and are being unsold on what we have. There are, said Dr. McFarland, hundreds of thousands of honest public officials; and we must quit branding them as a group or the honest, competent men will refuse to serve. We must also remember that human nature can change and improve; we must treat people as if we expect the best of them, and they will usually come through.

Progress in Air Transportation *Your Time is My Business* was the subject of a talk by James W. Austin, vice-president of traffic and sales for Capital Airlines. He said that 1951 was the first $1,000,000,000 year for the airlines and that 22,000,000 passengers were carried. This is a big increase over the early days of the industry, when it took 10 years to carry the first million people. The fact remains, said Mr. Austin, that only about 5,000,000 people in this country use the airlines. The future growth of the industry depends upon mass business, upon inducing more people to fly. He said that the airlines spent $75,000,000 in 1951 on sales efforts, that facilities have been expanded and improved, and that safety remains the main objective.

TECHNICAL SESSION

Most of time in the last day's meeting was devoted to technical papers and discussions, presided over by Professor Walter C. Voss, head of the department of building engineering and construction, Massachusetts Institute of Technology. He gave a brief history of lime research to date and told of the progress being made in association-sponsored research before introducing the various speakers.

Lime in Blast Furnaces *Lime Injection to Blast Furnace Tuyeres* was the subject of D. M. Morrison, metallurgist, A. J. Boynton & Co., who opened with the remark that limestone is the thing the blast furnace man uses "as little as possible of". He said that lime injection is excellent theoretically and may be one of the greatest advances in blast furnace operation in history; but it presents many operating problems which must yet be solved. Even if they were solved, the use of lime would still have to stand or fall on the basis of economics. Using a slide showing vertical and cross sections of a blast furnace, Mr. Morrison described the construction and operation of such a furnace. Lime injection, he said, would give closer and better slag control and consequently better iron, as iron is really the byproduct from a metallurgical standpoint; and a good slag must be made in order to get good iron.

According to Mr. Morrison, the first full-scale installation for lime injection has been made in a Clairton, Pa., steel plant but its operation has been delayed by material shortages and the steel strike. Preliminary tests have, however, been made with bagged lime. In an installation there is a feed screw for each tuyere—varying from 8 to 24 for different blast furnaces. There are, he said, 238 pig iron blast furnaces in this country with a capacity of about 73,000,000 tons annually. Using .44 tons of limestone per ton of pig calls for 32,000,000 tons of stone. Lime would replace from 15 to 20 percent of the stone, or a total of 2,700,000 tons of lime annually. This requirement compares to the total lime production, which was 6,300,000 tons in 1949. With the quality of iron ore and coke getting steadily lower, the percentage of stone required per ton of iron is going up. Under these conditions, the use of lime would result not only in better iron quality and closer control, but also in lower cost and higher capacity. A fly in the ointment, however, is that if this method proves successful, some of the larger steel companies will inevitably produce their own lime.

Fundamental Research Professor James A. Murray, associate professor of materials, M.I.T., gave a report on the fundamental research fellowship at that institution which is developing independent and basic information on slaking, plasticity, and burning for the Association. By the use of slides he showed the varying effects of the amount of slaking water used and its effect on the settling rate. The placticity also varied with the water; and in dolomitic limes there was a flat spot, at about the point the plasterer uses, where the percentage of water had very little effect. In these tests he used a concentric cylinder viscometer and a new type of penetrometer which has not yet been perfected.

In discussing the research to date on burning, Professor Murray reminded his listeners that he reported two years ago on the burning of pure calcite at temperatures of from 1,700 to 2,200 deg. F. Last year he reported on the burning of high-calcium limestone and on the fact that some limestones fluxed at anywhere from 1,700 to 2,300 deg. Fluxing at the lower temperature, he said, should not happen, but a glass forms at this temperature from the one part in 200 which fluxes and gradually builds up a ring in the kiln. It was decided to concentrate on this problem for this year. Thirty different samples of ¾-in. high-calcium limestones were obtained from members for use in the tests. Chemical,

geological, and other analyses of these stones are being made, and they will then be burned in platinum to avoid contamination. It is hoped, said Professor Murray, that some tentative results on this work will be available in time for the operating meeting in September.

Neutralization and Fish *Neutralization of Ponds and Lakes* was the title of an address by Roland F. Smith, fisheries biologist, N. J. Fisheries Laboratory, New Brunswick, N. J. Mr. Smith observed that the factors which make for poor land crops also make poor water for fish as the water takes on the characteristics of the soil. By means of a chart he showed that in water with a pH of 4.0 to 5.0 there are fish in abundance and variety, but that even when stocked for years, fish will not reproduce in acid waters with a pH of less than 4.0. The introduction of lime in acid waters for fish has been practiced in Germany for 200 years, said Mr. Smith, but it has only recently been begun in this country. It is now being done in some of the coastal states. Wisconsin and other states plan to follow suit.

The best results, according to the speaker, are obtained with a combination of limestone and hydrated lime, in order to get both quick and lasting action. As an example he told of one lake which was raised from a pH of 4.0 to 9.0 in six hours and in three days the pH of the lake it drained into also went up from 4.0 to 7.7. Dilution by rain gradually lowered the pH in both lakes until after eight months it had dropped to between 5 and 6. In another lake where limestone alone was used the pH was raised from 3.1 to 7.0 in three weeks but it stayed up longer. A pH of from 7.0 to 8.5 (neutrality) is best for most fish, but excellent growth of some varieties is achieved at from 6.5 to 7.0. In some New Jersey lakes the requirement has been 3 to 5 lb. of lime per 100 cu. ft. on a $CaCO_3$ basis.

Kaiser Gypsum

(*From page* 83)

head end of the board-forming run. Length of the machine from forming rolls to the cut-off knife is 287 ft., with an accelerated-speed section 50 ft. long following to the transfer end, where the board product enters the Coe three-zone steam dryer. The inclosed drying section is 235 ft. in length from feed to cooling section. Auxiliary heat is introduced into the third zone by a system perfected by the management to hasten the drying process to match a 50-percent speed-up on the board machine. Approximately 6,000,000 B.t.u.'s per hr. is generated by propane gas burners and forced into the third zone, where any remaining moisture is driven off rapidly. Steam for basic heat in drying is produced by a Keeler 250-hp. oil-fired water-tube boiler.

Finished board sections coming off the cooling section of the dryer are bundled, palleted, and moved to the warehouse by Elwell-Parker and Clark fork-lifts. In addition, a McDonald-Peterbilt grab-lift truck is used to handle the rolls of paper. This unit has proved to be an extremely efficient tool in the paper-storage room as it is able to lift, lay down, or stack the heavy rolls quickly from a vertical to a horizontal position, or *vice versa*.

Plasterboard, punched lath, and exterior sheathing comprise the products of the Redwood City plant, and shipments are made by rail except for some truck deliveries in the San Francisco Bay area and peninsula cities. The plant is only 25 miles south of downtown San Francisco.

Ernest Schaper is plant superintendent, having been elevated to the position from his former post as chief engineer at the Long Beach plant when the Redwood City operation was taken over in 1949. O.K. Halladay is maintenance supervisor, and Ed Hayes is board-plant foreman.

The Long Beach plant in 1951, too, underwent the most important expansion program undertaken since the board plant was added there in 1946-47. Included was the erection of a fourth Ehrsam kettle and the installation of another Raymond roller mill, increasing calcining and grinding capacity by nearly 35 percent. The Long Beach plant, in addition to board products, markets a full line of plaster and other gypsum specialties.

The next major move scheduled by Kaiser Gypsum will be the erection of a modern $2,500,000 plant at Seattle. A nine-acre tract of land adjoining the Permanente cement-distributing and packing plant on the Duwamish waterway was acquired for this purpose in 1951. The new plant will serve the entire Pacific Northwest and Alaska. The Seattle project, still in the planning and engineering stage, will consist of a three-kettle operation, plus a board plant capable of turning out 100,000,000 sq. ft. annually. Raw material will be waterborne and quarried at San Marcos.

Headquarters of Kaiser Gypsum are in the Kaiser Building, 1924 Broadway, in Oakland. Claude E. Harper is vice-president and general manager, and John V. Pooler is manager of gypsum operations.

California Mines Division Issues Geologic Guidebook

A new geologic guidebook—second in the California Division of Mines guidebook series—entitled, *Geologic Guidebook of the San Francisco Bay Counties: History, Landscape, Geology, Fossils, Minerals, Industry, and Routes to Travel*, is now available, according to Olaf P. Jenkins, chief of the division.

There are 32 authoritative articles in the book, each prepared by a technical expert. The *Guidebook* contains 392 pages and more than 300 photographs, drawings, and maps. Price, $2.50 per copy. Published by the Division of Mines, Ferry Building, San Francisco 11, Calif.

A.S.T.M. Requested to Aid In Conserving Rare Materials

As an aid to the Office of Defense Mobilization in carrying out its objectives, the American Society for Testing Materials has been requested to develop methods of conservation of scarce materials, through the use of substitute materials or through more efficient use of materials. By formal contract these services will be rendered to John R. Townsend of the Bell Telephone Laboratories, recently appointed consultant to the Director of Defense Mobilization on Conservation of Materials.

To carry out this work the Society has employed a staff engineer, Howard S. Phelps, who recently retired as engineer in charge of the Testing Division, Engineering Department, Philadelphia Electric Company.

Gravel Pits Grow Greens For U.N. Forces in Korea

Gravel pits in Japan—some of them—are yielding strange products these days. Instead of yardages of sand and gravel, tons of fresh vegetables are being taken from the pits at the U. S. Army hydroponic farms at Chofu, Japan. Through the miracle of soilless gardening at least one C-54 shipment of fresh vegetables is flown each day from the farms to the U.N. military forces in Korea.

The "crops" are grown in gravel-filled pits, and the nutrient elements needed are furnished in liquid form three times daily. Improved varieties of seed are supplied by American seed firms.

The Defense Production Authority has set a goal of 8,400,000 long tons of U. S. sulphur production by 1955, a 38 percent increase over requirements of 6,080,000 tons in 1950. The agency said that it would issue fast tax write-off allowances to firms that expand their sulphur capacity.

...IT AND ...UARRY Special

24th ANNUAL CEMENT-MILLS SECTION

JULY 1952

sands

slimes

slurries

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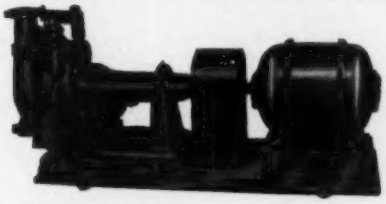
centrifugal PUMPS

Companion to the famous Wilfley Acid Pump



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It's the rugged, rock-proved Type BD hydraulically dumped body featuring EASTON's patented automatic down folding side gate.

This fast, versatile hauler switches easily from job to job, handling rock, ore, earth or mixed loads over any road or grade that your chassis can negotiate. It's a newcomer, introduced a little more than a year ago, rapidly winning interest for fast, low-cost hauling in many types of off-highway service. For complete information ask your local off-highway truck salesman, or write to:

Easton Car & Construction Company, Easton, Pennsylvania

Now you can have these big side-dump advantages in a versatile side-dump unit

Your driver sees where he is going.
No need to back and turn at the dumping point. Saves time, saves fuel.
You roll up, dump and roll on!
Capacities to 30 tons or larger.
Mounts on any heavy-duty off-highway truck chassis.

EASTON SIDE-DUMPS

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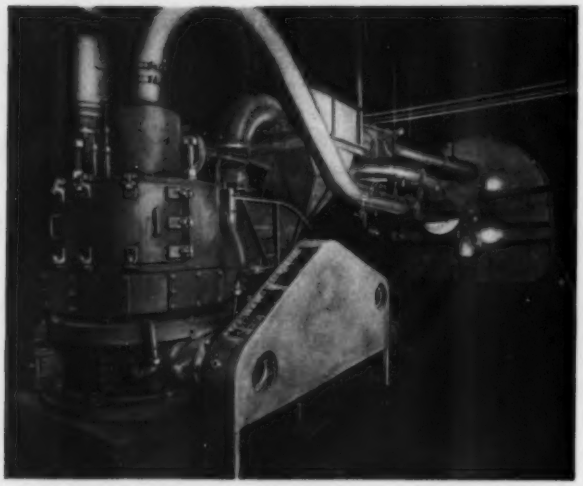

B&W DIRECT-FIRING FOR KILNS

The ultimate in kiln firing is obtained with the B&W Direct-Firing System, using the B&W Type E Pulverizer.

This system provides: (1) High availability; (2) Low operating costs; (3) Uniform delivery of coal; (4) Low rate of wear on grinding elements — hence low maintenance; (5) Ability to handle high-moisture coals.

B&W CLOSED-CIRCUIT RAW GRINDING SYSTEM

High grinding efficiency, high fineness and low power consumption characterize the B&W Pulverizer for raw material grinding. It is widely and successfully used for pulverizing cement rock, limestone, shale, phosphate rock, ores, and other materials. Drying can be accomplished within the system.

Power requirements are low and efficiency is high. Low maintenance and minimum floor space are also features.

B&W NOSE-RING CASTINGS

These castings are demonstrating outstanding ability to outlast conventional design by wide margins, reduce kiln maintenance, and prevent costly shutdowns; belling out of kiln shell is eliminated, resulting in maximum nose brick life; protecting flange on casting permits use of low-alloy steel bolts.

B&W KILN FEED PIPES

These feed pipes are widely used in cement plants because of their resistance to both heat and destructive abrasion. A central C clamp permits renewal of the lower portion if necessary.

C-3001

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A step toward reduced operating costs will be found in the use of B&W products; all have long, outstanding records of dependable service.

B&W WEAR-RESISTANT CASTINGS

Chilled iron and alloy steel liners, roll heads, slugger plates and other B&W wear-metal castings are CAST TO LAST . . . keep grinding and crushing equipment on the job . . . prevent unscheduled shutdowns for costly, time-consuming repairs and replacements.

B&W RETAINING RING CASTINGS

These tail ring castings give long and economical service at feed-ends of rotary kilns in temperatures exceeding 1200 F. They provide proper size kiln openings without special installations and cutting of bricks. Overlapping segments eliminate spillage of raw materials in dust chamber, and reduce stack losses. Provision for ample expansion eliminates bell-mouthing and consequent effect of kiln sealing.

BABCOCK & WILCOX

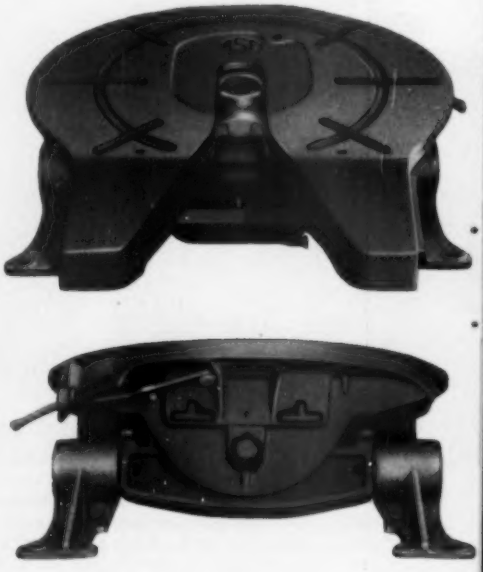
One of the four tandem units operated by Marquette Cement Company's quarry at Oglesby, Ill. . . . where ASF Safety 5th Wheels are standard equipment. Gross weight, including tractor, is 175,000 pounds; gross weight hauled by front 5th wheel, 160,000; net weight of load, 80,000.

20,000 pounds—down the hatch!

If you were looking for an operation that punishes 5th wheels, you couldn't find a tougher one than this. Side dumping—with the weight of the trailer and the load thrown off balance—builds up a wrenching, twisting strain that's concentrated on the 5th wheel. Not just once in a while, but many times—day in and day out.

Heart of the tandem—the ASF 5th Wheel

Here's the 36" extra-heavy-duty ASF Safety 5th Wheel made especially for the rugged service and heavy loads found in off-highway work. Cast alloy steel gives it the strength needed for handling loads up to 100 tons . . . side oscillation gives your units the flexibility needed to absorb the twisting side-strains of uneven roads.



The Marquette Cement Company proves that your best investment for safety and heavy-duty service is an ASF Safety 5th Wheel . . .

"best 5th wheel we've ever used"

Quarry work—just by the nature of the operations involved—gives most any kind of equipment a beating. And 5th wheels get their share!

As a case in point, take Marquette Cement Company's quarry in Oglesby, Illinois, where side-dumping tandem units are operated, each unit with 40,000 pounds net load. Read what Bill Spurr, Quarry Superintendent, has to say about his firsthand experience with ASF Safety 5th Wheels:

> **"We have been using ASF Safety 5th Wheels exclusively on our 4 tandems and 2 semi's for the last 6 years. The wheels we used before that time often took an hour or more to uncouple, but the problem was solved quickly by switching to ASF wheels. Now it doesn't take us more than 10 minutes to couple or uncouple.**
>
> **"Side dumping of the load into the crusher hopper puts a heavy twisting strain on these 5th wheels, and in the case of the tandems, the front wheel is often pulling over 160,000 pounds gross.**
>
> **"That's tough service, and these ASF Safety 5th Wheels are the best 5th wheels we've ever used."**

There are sound reasons why ASF 5th Wheels can stand up in tough service. For example, the "I" beam crossbar is a recent development that helps the ASF 5th Wheel keep pace with the stresses of heavier equipment carrying heavier loads. King-pin bearing area is the largest of any 5th wheel made. Coupling is quick and easy—but uncoupling is impossible when the easy-to-see lock lever is in "locked" position. Side oscillation adds flexibility to your entire unit—tractor and trailer—so that it "rolls with the punch" instead of rigidly resisting the side strains of uneven roadway.

For complete freedom of interchange between motive power and load-carrying equipment, you can't top the quick convertibility of the *tractor trailer*. And, for the facts on the best 5th wheel investment you can make, see your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

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	Dayton	Rim & Wheel Service, Inc.
	Dover	Weaver Truck, Trailer & Body Corp.
	Toledo	Titsworth Trailer Sales & Serv.
	Youngstown	Bennett Brake Service
	Youngstown	Smith Brake & Parts Co.
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ORE.	Portland	Auto Wheel Service
PA.	Allentown	Allentown Brake & Wheel Serv.
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	Philadelphia	United Equipment, Inc.
	Pittsburgh	Wilcox Bros. Co.
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S. DAK.	Sioux Falls	Sioux Brake & Equip. Co., Inc.
TENN.	Chattanooga	Power Brake & Supply Co.
	Knoxville	Harris Automotive Serv., Inc.
	Memphis	Southern White Sales Co.
	Nashville	Safety Service Co.
TEXAS.	Dallas	Southwest Wheel, Inc.
	Houston	Southwest Wheel & Equip.
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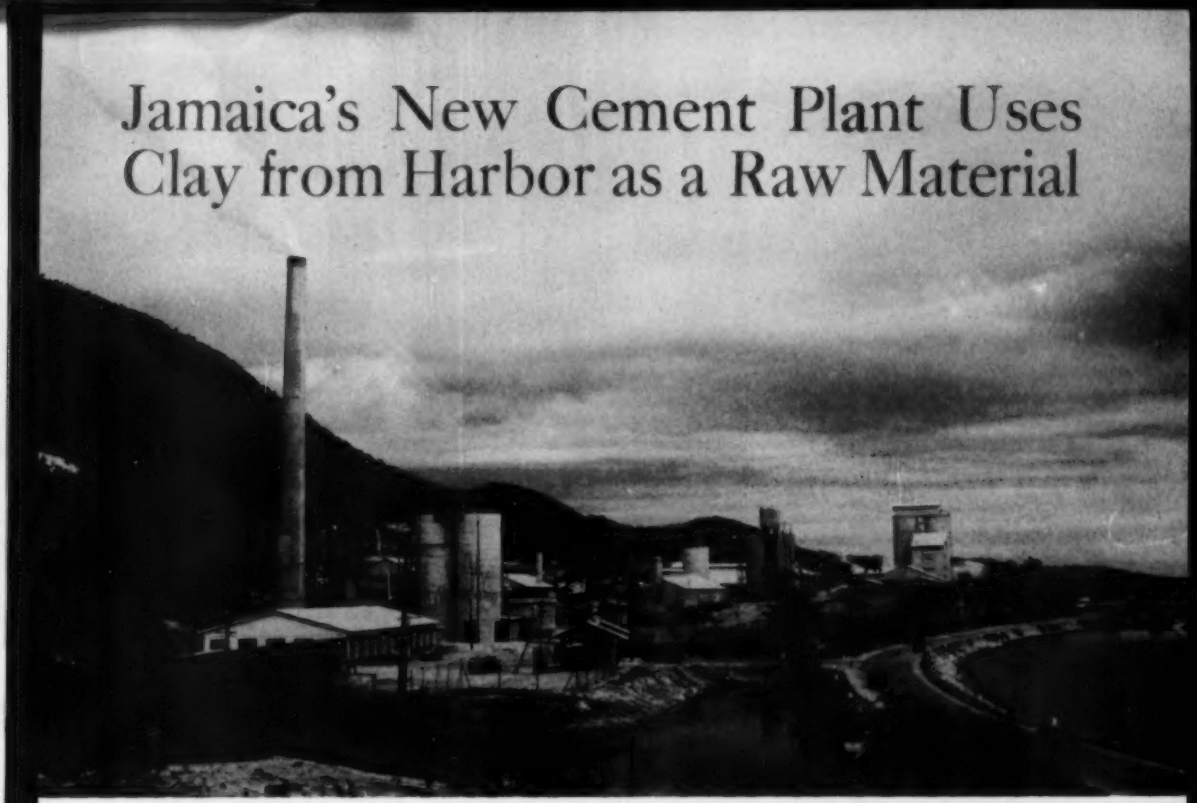
Jamaica's New Cement Plant Uses Clay from Harbor as a Raw Material



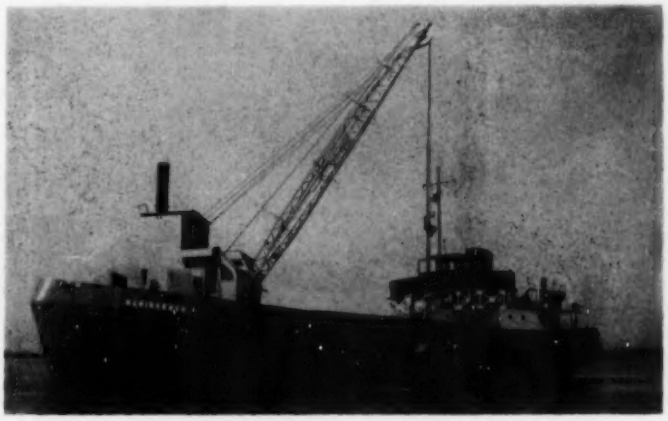
Caribbean Cement Company's 600,000-bbl. per year wet-process plant near Kingston, Jamaica. The firm's wharf and washmill are just outside the photograph, to the right.

By THOMAS W. HILL
President, Caribbean Cement Company Ltd.

THE Caribbean Cement Company Limited, whose 600,000-barrel per year plant was completed in January of this year at Rockfort, a suburb of Kingston, Jamaica, can claim an achievement which, because of certain unusual difficulties encountered and overcome during the construction period, may well constitute a world record of sorts.

The "unusual difficulties" include a hurricane which tore through Jamaica when the plant was nearing completion, causing damage estimated at $45,000,000 and 154 deaths in the island. Despite this and other unforseeable acts of nature and man, the Jamaica plant was completed in less time than required under the terms of the company's agreement with the government and at no increase in cost over the original estimate.

One man-made difficulty which threatened to be a disaster for the Caribbean Cement Company was the devaluation of sterling, which occurred just a few months after the machinery and equipment orders had been placed in England. Devaluation meant that British buyers had to pay over 40 percent more for anything bought outside the sterling area—a fact which naturally resulted in a sharp inflationary trend within the sterling area, quickly evidenced in rising prices of steel, machinery, etc. That construction of the Jamaica plant continued through nearly two years of this general inflation without exceeding the original cost estimates is unquestionably cause for gratification. Calculated in dollars, the net result was a plant costing only $3,200,000, including working capital, a diesel-electric power plant, a deep-water wharf, and all machinery, buildings,



Caribbean Cement Company's clay dredger at work in Kingston harbor.

and properties to produce 1,800 barrels of cement per day. This works out at only about $5.53 per annual bbl., including all extras.

The hurricane, which struck Jamaica on August 17, 1951, caused surprisingly little damage to the cement plant. Some temporary construction buildings were demolished and some of the asbestos-cement siding on the plant buildings was torn loose. The company's clay ship was driven up on the beach and suffered minor damage. Finally, the violent rains which followed the hurricane winds caused temporary flood conditions, resulting in some apparent water damage to certain of the electric motors. Total hurricane damage did not exceed $18,000 and all damage was repaired within a few weeks, with a comparatively short delay in the overall construction program.

The wharf and washmill, showing the clay dredger, which feeds the washmill, tied up at the left. The rotary kiln and stack can be seen in the background, left.

Choice of Site and Process The location for the Jamaica plant was selected after many other prospective sites had been investigated. Limestone is abundant on the island, and there were other locations in which clay or shale existed reasonably close to workable limestone deposits. The site finally chosen, however, was definitely superior to others in these respects: the reasonably level topography, permitting comparatively inexpensive clearing and construction operations; closeness to principal markets; and closeness to deep water for inexpensive shipping.

By far the largest market in the island of Jamaica is Kingston. Other Jamaican markets can be reached either by road or water and, of course, export markets can be reached only by water. It was essential, therefore, that the cement plant be located near Kingston, adjacent to a main highway and as close as possible to tidewater. Accordingly, the site chosen is in the outskirts of the capital city, on a main highway and on the shore of one of the best natural harbors of the world—Kingston Harbor.

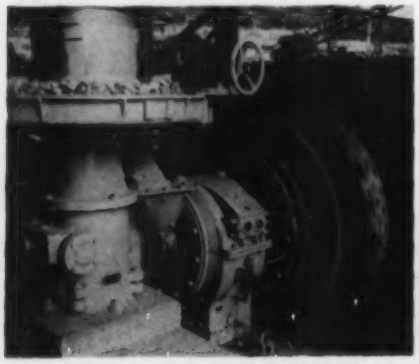
The wet process was chosen for the Jamaica plant. If there had been no other reasons for this choice, the raw materials would have dictated the use of the wet process. As discussed in greater detail later, the argillaceous material used is a plastic clay dredged from the bottom of Kingston Harbor. It should be mentioned, further, that water supply presented no problem and ample fresh water is available. The wet process was thus a natural choice.

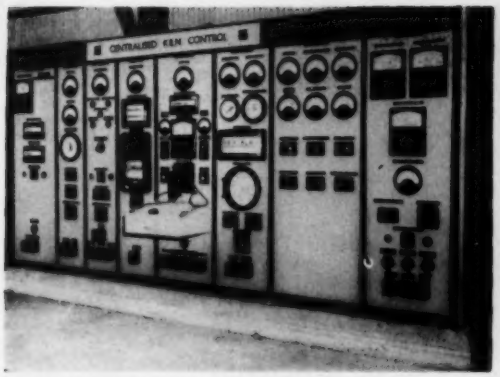
Abundant Raw Materials The Jamaica plant is favorably situated with respect to all of its raw materials. Limestone is quarried from a mountain directly behind the property. Clay, containing a proportion of silica, is dredged from the mouth of a river about seven miles from the plant and transported, 500 cu. yd. at a time, in the dredger, to a washmill on the company's wharf. Gypsum is purchased from a company which quarries it just a few miles from the cement plant.

The limestone is very good material chemically and is soft and comparatively easy to grind. The

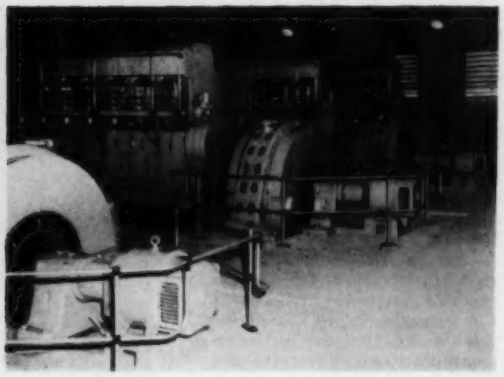
Right: The 300-ft. long oil-fired kiln, which has a capacity of 300 tons of clinker per day.

Below: The horizontal revolving plate feed table feeding limestone to the raw mill.





The centralized kiln control board covers all phases of the kiln and cooler operation.



Diesel-electric generating sets in the Caribbean Cement Company's power plant.

softness, combined with the presence of a fairly large number of fissures in the rock, through which the effect of the explosive is somewhat wasted, creates some problems in the quarrying. Experience to date indicates a slightly lower tonnage per pound of explosive than might be the case with a harder rock of more consistent density. Limestone reserves are vast.

The clay bed, providing a virtually unlimited source of argillaceous material, has proved to be very satisfactory. It contains a substantial quantity of small shells, variable within narrow limits. These are screened from the clay slurry at the wash mill and, for the present, are disposed of as waste. Consideration is being given to a proposal for feeding these shells into limestone storage.

Raw Material Preparation The limestone is almost entirely free from overburden. The floor of the quarry is 150 ft. higher than the terrain in the immediate vicinity of the crusher. The face of the quarry is at present about 60 ft. high and 150 ft. long. The hill has a slope of about 45 degrees. The intention is to extend the quarry face an additional 300 ft. After the face has been cut back to approximately 60 ft., quarrying will be commenced at a higher level and continued over the same length of face.

Drilling is done with Climax jackhammers. After drilling and blasting, the rock is loaded by a 1¼-cu. yd. electric shovel into dump trucks that haul it a distance of 300 yd. down the quarry road to the crusher. Quarry operations are on a 7-day (8-hour-per-day) basis at present, for the purpose of building a limestone stockpile which will permit suspension of quarrying operation, if necessary, during Jamaica's brief rainy season.

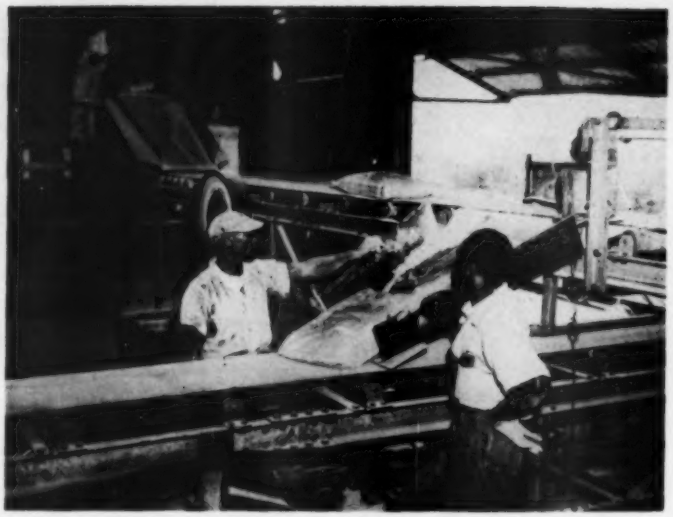
The limestone, dumped into a concrete hopper, is fed by a 5- by 27-ft. laminated conveyor to a 60- by 70-in. F. L. Smidth single hammermill, V-belt driven by a 175-hp. motor. Reduced to under one inch size by the hammermill, the limestone is conveyed by a rubber belt conveyor approximately 200 ft. to a silo. From this point it is fed, by means of a 6-ft. diameter horizontal revolving plate feed table of F. L. Smidth design to the raw mill. The limestone silo will hold an 18-hr. supply of crushed limestone; a stockpile of uncrushed limestone is being built up on the quarry floor, and open storage of crushed limestone near the storage silo is contemplated.

The clay washmill is located on the company's wharf, where is can receive clay directly from the clay dredger. As mentioned previously, the clay is screened to remove small sea-shells etc. From the washmill the clay slurry is pumped by Wilfley slurry pumps a distance of about 500 ft. to the clay slurry silos adjacent to the raw mill.

Both the raw and cement mills are F. L. Smidth 3-compartment Unidan mills, having an inside diameter of 8 ft. and an inside length of 36 ft., driven by 900-hp. motors through Symetro gear units. In the case of the raw mill, the reduction is 750/19.6 r.p.m. After being ground at a rate of 25 t.p.h. the limestone-and-clay slurry is pumped to the slurry basin and correcting silos, and fed from them into the kiln.

Clinker Production and Handling The kiln is a wet process F. L. Smidth Unax kiln, 300 ft.long by 10 ft. diameter with an enlarged burning zone approximately 11 ft. in diameter. It is oil fired. Bunker C fuel oil, pumped from an oil company tank farm adjacent to the

A chain drag conveyor delivers clinker from the cooler to the storage pile.



Bagged cement being conveyed from the packer for loading.

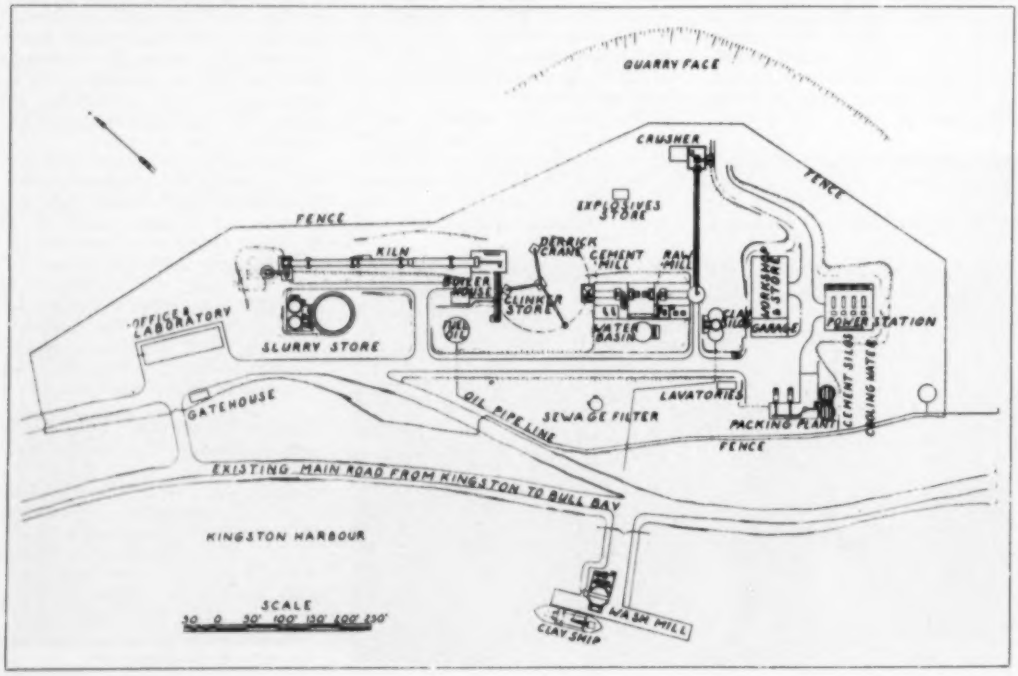
cement plant property to a tank near the kiln, is preheated in a small steam plant and then pumped to the burner.

An 85-hp. motor drives the kiln through a reduction gear. There are the usual kiln accessories such as the exhaust fan (V-belt-driven by a 70-hp. motor), the firing fan (V-belt-driven by a 30-hp. motor) and standard chain system and movable kiln hood for closing the outlet end.

A centralized kiln control panel provides the necessary instrumentation to give a comprehensive picture of all phases of kiln and cooler operation. In addition to the normal Stop-Start and Increase-Decrease controls on the control board there are the following: smoke chamber draft gauge; smoke chamber temperature indicator; smoke chamber temperature recorder; kiln slipring pyrometer; exhaust fan speed indicator; louvre damper position indicator; slurry feed indicating lamps for feed to kiln and overflow; slurry speed indicator and recorder; kiln speed indicator and recorder; primary air temperature indicator; primary air differential pressure gauge; cold and hot air damper position indicators; oil flow meter; oil flow temperature indicator; oil flow recorder; ammeters and speed indicators for cooler fan and grate cooler; and air pressure gauge for Folax cooler.

The kiln has a capacity of 300 long tons of clinker per 24-hour day. From the kiln the clinker passes through a Folax grate cooler, and then by a drag chain conveyor to the clinker storage pile.

Cement Mill to Packhouse In a country such as Jamaica, where precipitation is infrequent (30 to 35 in. of rainfall annually in the Kingston area), uncovered storage of clinker, limestone, and gypsum is practical and economical. Clinker is stored in the



Sketch plan of the Caribbean Cement Company's 600,000-bbl. per year wet-process plant at Kingston.

open, where it falls from the drag conveyor. Gypsum, purchased from a company which operates a gypsum quarry just a few miles away, is piled near the clinker, so that both can be handled by a rotating 7-ton jib crane which feeds them into their respective feed hoppers on the outside of the mill building.

Clinker and gypsum are fed by 4-ft. diameter horizontal revolving feed tables to the cement mill, previously described. The two feed tables are coupled together with a common drive. The mill is driven by a 900-hp. motor through a 750/18.8 r.p.m. Symetro gear unit. A three-compartment automatic dust filter is provided at the mill and another at the packhouse.

The finished cement is pumped to the cement silos by a Fluxo pneumatic system. Two silos were constructed initially, but there is provision for four more. From the cement silos the cement is drawn off and bagged by means of a Fluxo packer with a capacity of 70 t.p.h. The filled bags are carried on a rubber belt conveyor and travelling cross conveyors and loaded into trucks.

Because the plant is located on tidewater it is expected that export shipments will be made, in due course, direct from the company's wharf. The water at the end of the wharf, as at present constructed, will accommodate vessels of up to 15-ft. draft. However, the bottom drops off quickly, and it will be a simple matter to extend the wharf to provide for the loading of the largest vessels afloat, if the competitive situation should necessitate such an extension later. For the time being, the bulk of the output of the plant is sold in Jamaica, and such small export shipments as can be spared are not enough of a factor to justify extending the wharf to greater depth.

Power Supply and Services The Caribbean Cement Company operates its own generating station, in which are installed four 3-phase, 890 kv.-a. 0.9 power factor (leading), 800-kw., 3,400-volt, 50-cycle, 375 r.p.m. Crompton-Parkinson alternators direct-connected to Mirrlees Supercharged diesel engines. Three generating units can supply the plant's peak load comfortably, and one unit serves as standby. When one mill is shut down but the remainder of the plant is operating, two generators are used. If both mills are shut down but the remainder of the plant is operating, one generator is used.

Electric energy is distributed at 3,400 volts to transformers in the six main departments, where it is stepped down to 440 volts for power and 220 volts for lighting. Normal plant power factor is 0.9 leading, with both mill motors operating on load.

Diesel oil is pumped from the facilities of an oil company next door and stored in a tank adjacent to the generating station. Untreated fresh water for the slurry and for cooling purposes is supplied from a well nearby which was ceded to the cement company by the government. Drinking water is taken from the city supply.

All plant buildings are of steel frame construction, with corrugated asbestos-cement siding and roofing. In addition to the buildings housing the equipment described above, the facilities include a large machine shop, a garage, an office and laboratory building, and a gatehouse. The plant has been laid out to permit expansion doubling the initial capacity at the minimum cost.

Acknowledgments Design and construction of the Caribbean Cement Company plant were supervised by F. L. Smidth and Company Ltd., who also provided the main cement-making machinery. Site levelling, all concrete work, and road and building construction were handled by Monberg and Thorsen Ltd., of Denmark; and the steel buildings and asbestos cement sheeting were installed by A. J. Main & Company Ltd. of England.

Laying of a 6-in. pipeline a distance of approximately three-quarters of a mile to provide the cement company's fresh water supply was done by the Kingston Water Commission. Mirrlees, Bickerton & Day Ltd. supplied an erector to supervise local labor in the erection of the diesel engines in the power station.

All the remainder of the erection was carried out by the cement company under the supervision of one chief erector and two assistants supplied by F. L. Smidth. Approximately 200 local men were employed on the construction and erection activities, including 25 fitters.

Practically all transportation of equipment from the ship to the plant site was done by the company except for the mills and kiln sections, for which a local contractor built a special low trailer.

During the construction work it was found that the most satisfactory results were achieved by letting out the work on a piecework basis. This applied particularly to hand excavation, hand levelling, etc. Certain of the more intricate work could not be handled in this way as it proved difficult to provide sufficient supervision to make sure that such work would not be skimped if done at piece-work rates.

Although a tender was made in England for the provision of four welders and their helpers and welding equipment to weld the kiln, the cost involved was considered too high and the cement company decided to use local welders. This proved quite satisfactory. The final lining up of the kiln had to be done after dark, due to variation of temperature in the day time.

The Caribbean Cement Company is truly international in all respects. The financing was underwritten by British, American, and Jamaican capital, with some of the capital coming, as well, from Bermuda, the Bahamas, and other British West Indies islands. The board of directors consists of a managing director plus two directors from England, two from the U.S.A., and three from Jamaica. The American group associated with the Caribbean Cement Company, and represented by two directors on the board, is the Cement and General Development Corporation of New York.

The field work in Jamaica was supervised by L. H. East, O.B.E., as resident engineer for F. L. Smidth and Co. Ltd. Mr. East has since accepted the post of managing director. Other plant officials include H. F. V. Tame, secretary; Mr. Ratz, works engineer; Mr. Thomsen, chief chemist; Mr. Howes, mill foreman; and Mr. Sherill, burnermaster.

● Correction

In the review of developments in the cement industry published in the January, 1952, issue of PIT AND QUARRY, page 126, it was erroneously stated that an 11-ft. 3-in. by 464-ft. rotary kiln installed at the Marquette Cement Manufacturing Company's Des Moines, Iowa, plant was of Allis-Chalmers manufacture. This kiln, originally built for the China Portland Cement Company, and never installed because of the Red invasion of that country, was built by F. L. Smidth & Company.

Fischer Lime and Cement Company, Little Rock, Ark., has announced the opening of its modern wholesale warehouse at 1650 East Washington Avenue, North Little Rock, Ark.

MARQUETTE'S NEW MISSISSIPPI PLANT

Designed for Unusual Raw Material

Deposit ranges from marl to hard limestone

By WALTER E. TRAUFFER

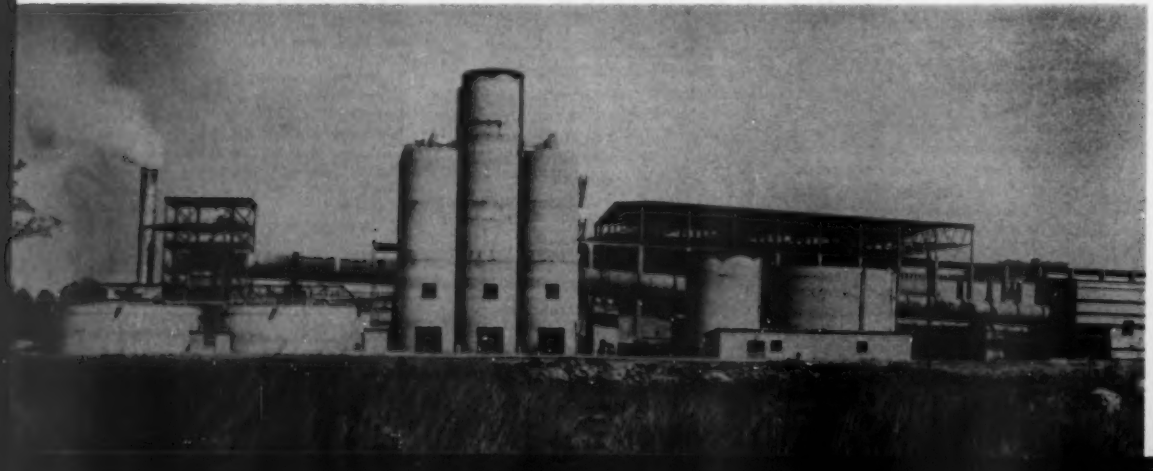
ON THE SPOT

THE new plant of the Marquette Cement Manufacturing Company at Brandon, 12 miles east of Jackson, Miss., is the only cement plant in that state. Like the several other new plants built in this country in recent years, it is a thoroughly modern operation designed to produce a high grade of portland cement economically and efficiently. It is soundly engineered in all of its departments and uses the latest proved types of equipment. It is flexible enough to produce almost any desired type of cement, and provisions have been made to double its 1,000,000-bbl. annual capacity with the minimum of trouble and expense. This plant went into operation late in November, 1951. It is designed to produce standard, high-early strength and masonry cements; and provisions have also been made for the possible future manufacture of oil well cement. This plant is a notable contribution to the growth of the industrial South, which is rapidly changing from a heavy farm economy to a better balance of agriculture and industry.

This plant does, however, differ from any of the other recent new plants in that it contains a number of new methods and machines, some of them made necessary by the unusual type of raw material. The deposit is said to be unlike any other in the industry, consisting of a mixture of 11 different types of rock, ranging from clay and soft, sticky marl with a moisture content of up to 30 percent to hard limestone with a crushing strength up to 1,500 p.s.i. After thorough tests had determined the washability of the clay and marl, special crushing and washing methods and equipment had to be developed to process it. Included is a new type of single-roll crusher and a washmill also specially designed. Also of unusual interest is a special mix control method designed for this material. The packhouse, too, has unusual features, including provisions for quick changeover from one type of cement to another. Another feature is the use of air conveyors wherever possible. The general layout of the plant is compact, with all departments centered about the materials storage building.

Exploration and Deposit The deposit from which this plant is being supplied is not the chalk found in the north-

A general view of Marquette's Brandon plant. Slurry tanks are in the foreground; the kiln and the storage building in the background.

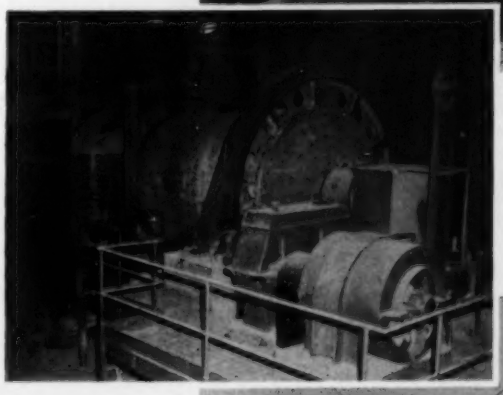


eastern part of the state; it is a sedimentary formation having layers of marl and limestone in thicknesses of from 10 to 30 in. with a total average depth of about 25 ft. The quarry is in an outcropping of the Vicksburg Group which contains the Glendon limestones, interbedded with soft marl, hard marl, and clay, with marl predominating. It is typical of the material found in the area south of a line drawn from Vicksburg southeastward below Meridian, Miss., toward Mobile, Ala. It is believed this line was once the northern boundary of the Gulf of Mexico. This formation abounds in fossils.

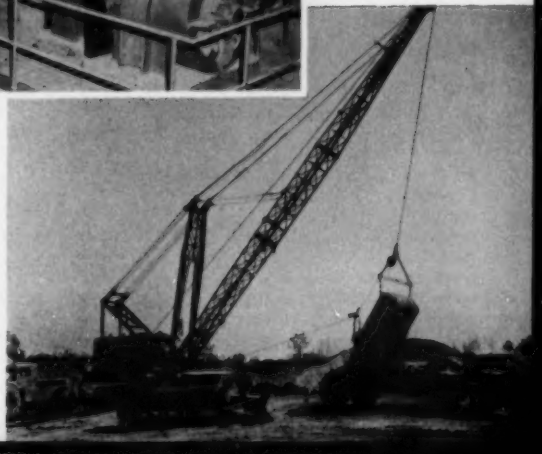
The need for a cement plant in Mississippi had been obvious for many years, and a number of deposits had been investigated and tested by the Mississippi Geological Survey and by various private interests. Beginning in 1936 and up to 1946 Marquette personnel looked over many deposits and coreholed a few at different points between Brandon and Vicksburg. Partly as a result of these tests and partly because of its extent and accessibility for both rail and highway transportation, the deposit near Brandon was selected. A total of 75 diamond drill holes were made by the company over the 500-acre property. These showed enough material for at least 50 years' operation at the projected 1,000,000-bbl. per year plant capacity. From the core drill tests statistical analyses of the deposit were made which showed the overall nature of the deposit to be suitable for cement manufacture. Then, in November, 1948, a total of 25 carloads of this material was shipped to the company's Cowan, Tenn., plant and tested under actual operating conditions as a cement raw material. It was found to be suitable in every way, but its gummy

The ten 10,000-bbl. cement storage silos, with packhouse and bulk-loading building (left).

Right: The storage building, with the traveling crane for rehandling limestone, clay, sand, masonry rock, iron ore, clinker, gypsum, and coal.



Left: The 8- by 10-ft. ball mill used for preliminary raw-material grinding.



Right: The dragline, with its 80-ft. boom and a 4-cu. yd. bucket, loading into 15-ton trailer trucks.

Above: One of the 15-ton trailer trucks dumping its load of raw material into the primary crusher hopper.

Left: The crawler-mounted rotary drill used for all primary blast holes.

Right: This view in the quarry shows the type of material in the deposit.

nature presented special physical handling problems.

It was realized that such a deposit could not be quarried in the usual manner, especially because it is underlain by a wet blue sand which would not support excavating and hauling equipment, and would have to be worked from the top down. It was also realized that crushing equipment specially designed for such sticky material would have to be used.

At first the marl and limestone deposit alone was used, with the addition of some silica sand; but it was soon found that the blue sand under the deposit could supply the needed silica. Now about 2 ft. of this is excavated at the same time to balance off the analysis. It was also found that most of the clay-loam and shale overburden could also be used, and it is now included. Future stripping will consist mainly of the removal of trees, roots, etc. The quarry is drained off through a ditch to creeks leading into the Pearl River.

Overburden Removal The overburden consists of from 10 to 30 in. of clay-loam and shale which in some places nears rock hardness. Stripping of the deposit was begun on June 1, 1951; and when this work had to be stopped in December, enough stone had been uncovered for a year's operation of the plant. Two Caterpillar DW10 tractors and No. 10 scrapers were used for this work, with a D8 Caterpillar tractor as a pusher when loading. The No. 12 Caterpillar Autopatrol grader used to level off the dump area also maintains the roads.

Drilling and Blasting Blast holes are drilled with a Joy Heavyweight Champion rotary drill using 3¼-in. tungsten carbide bits. Air is used to clean out the holes. Holes are drilled at an average rate of about 52 f.p.h. and about 1,000 ft. of hole is obtained before a bit needs to be resharpened. The resharpening is done by the James Tool Company, Dallas, Tex. Holes are drilled the full 25-ft. depth of the deposit and are spaced 6 by 14 ft. Dupont 45 percent extra dynamite is used with stemming in the soft ledges. Two- and three- row shots with about 18 holes in each row are made using delay caps. In the front row O- and 25-millisecond delays are used, 50 milliseconds in the second row, and 75 milliseconds in the third row.

Because of the variety of types of material, experience is the main factor in laying out a blast, loading, and stemming. The delay shooting yields about 4¼ tons per pound of explosive, with so little vibration that vibration measurement pins in the plant office a few hundred feet away have not yet been knocked over. The fragmentation is so good that very little secondary shooting is necessary. A jackhammer and 1½-in. powder are used for this shooting, which is done about once a week.

Explosives are stored in underground magazines far removed from all operations, highways, or habitations. The magazines are 10 ft. deep and in the side of a hill and are covered with 9 ft. of dirt, etc. They are proof against bullets, lightning, or any other foreseeable influences.

Loading and Hauling Loading out of the quarry is done at the rate of about 300 t.p.h. by a P&H 1055 dragline on the surface of the deposit. This machine has an 80-ft. boom and a 4-cu. yd. Page dragline bucket of special heavy design for the job. The dragline is powered by a Caterpillar D375 diesel engine. It is now also used about once a month to load out some of the clay from the spoil bank. When the stripped-off area is exhausted, the overburden, deposit, and sand will all be excavated simultaneously.

Hauling to the plant is done by three 15-ton Easton side-dump trailers pulled by Caterpillar DW10 rubber-tired tractors, with a fourth unit in reserve. The haul is now about 3200 ft. one way.

At the primary crusher building these haulage units run through the building and around a circle back to the quarry road. In the building the dumping is done in the usual manner with a centrally-located Easton elbow-type hook dumping mechanism. A sidewall supports the feet, which takes the dumping impact off the tires. A mark on this wall guides the driver in spotting for dumping, and the dumping mechanism is actuated by a pushbutton which he can reach from his seat. A limit switch stops the mechanism at the top, and when the load has had time to clear, the

driver pushes another button to start the body down, another limit switch stopping the hook at the desired point.

The sticky raw material at first had a tendency to stick in the trucks, reducing the hauling capacity considerably. Finally Superintendent William Moyle devised a set of plates which lie loose in the dump body, but fastened to its sides by chains, forming a false bottom. When the body is tilted into dumping position these plates drop with the material and are then stopped with a jerk by the chains, freeing them of all material. When the body drops back into position, the plates drop back into place.

Crushing The truck hopper has a capacity of two loads or 30 tons. A 6- by 12½-ft. Pioneer apron feeder discharges the material into the Pennsylvania Crusher Company "Dixie" 30- by 72-in. single-roll primary crusher with a traveling breaker plate. Both the crushing roll and the breaker segments have teeth which go between each other and keep both the rolls and the plate clean as the roll moves faster than the plate. The roll and the plate are spaced 10 in. apart. The Marquette engineering department had designed such a crusher to suit the material, but when the Pennsylvania Crusher Co. was approached to make it, this company was found to have patented an identical crusher in 1945 which it had never built. As only about 20 percent of the raw material is limestone, the teeth show comparatively little wear; but they are built up once a week to keep them sharp. This crusher is V-belt-driven by a 200-hp. Westinghouse wound-rotor motor and the breaker plate is chain-driven from the roll shaft.

The minus 8-in. product of this 72-in. wide crusher drops into a hopper which has an original arrangement to feed it onto the narrower belt conveyor without arching or sticking. On each side of the hopper is a 36-in. roll which rotates inwardly to feed the material down onto the belt. Scrapers keep these rolls clean. They are driven from the tail pulley of the 42-in. by 278-ft. belt conveyor to the washer building. This conveyor has rubber impact rollers at its receiving end. At its head end water sprays and two Stephens-Adamson scrapers are used to clean the belt after the material is discharged.

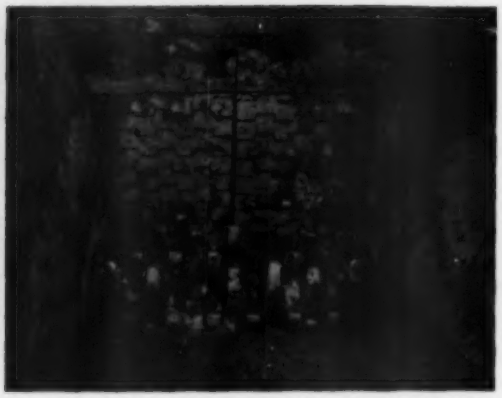
Washing and Raw Grinding The material drops into a 30-ton hopper in the washer building, and a 42-in. Link-Belt apron feeder discharges it into the 11½- by 26-ft. F. L. Smidth washmill. This mill was designed by the Marquette engineering staff, and Smidth worked out the details and built it. It is a continuous counter-current mill which receives the raw material in one end and the wash water in the other. It is supported on two slide shoe bearings which eliminate the usual two trunnions and make it possible to use the counter-current principle. A specially-designed small slide shoe bearing takes the end thrust. It is in this mill that the first separation is made of the hard and soft raw materials.

Left to right: William Moyle, superintendent; Carl E. Wuerpel, technical director; and Sam Webb, plant chemist and assistant superintendent.

Paddles or cascaders in this mill are set to retard the flow of material through it sufficiently to give the marl time to disintegrate. The pieces of hard rock serve as grinding media. The water and marl slip overflows the feed end of the mill through a slotted screen band and the clean rock is discharged from the other end to a 6- by 16-ft. Allis-Chalmers Low-Head 2-deck screen equipped with washing sprays. This screen has 2-in. and ⅝-in. openings, respectively, on its top and bottom decks, and the material over both is discharged into a Pennsylvania CF 13-44 Impactor reversible crusher. A 48-in. Pioneer apron feeder takes the impact of the material coming out of the crusher and discharges it on the first of two 36-in. by 100-ft. belt conveyors, which in turn discharge it on a pair of 4- by 8-ft. Symons single-deck screens. Conveyors were used

The general plan of Marquette's new cement plant at Brandon, Miss.

The single-roll primary crusher designed for this material has a toothed traveling breaker plate.



This view into the primary crusher shows the teeth on the single-roll and traveling breaker plate.

for this purpose instead of a bucket elevator because any undigested marl might stick in it, but the mill does its work so well that there has been no such material. It is at this point that the final separation is made between the hard and soft raw materials. The minus ¾-in. rock is carried on a 30-in. by 15-ft. belt to the rock section of the storage building. The plus ¾-in. rock over these screens is returned by gravity to the Impactor for further reduction.

In the summer when dry rock is received, the washer can be bypassed. A 36-in. by 48-ft. bypass conveyor takes this rock from the main conveyor direct to the Low Head screen and it is then passed through the Impactor and to storage. The same bypass conveyor can be used for feeding dry clay via the Impactor, screen, and conveyor direct to storage.

The washmill is also used for washing clay separately, and in this case an end plate is installed on the discharge end of the mill to prevent loss of the rock used for grinding.

The marl slip from the blade mill and the minus ⅝-in. material through the bottom deck of the Allis-Chalmers screen go to a 36-in. by 24-ft. Link Belt ribbon conveyor which feeds a Colorado Iron Works Akins double-screw classifier with two 48-in. by 25-ft. screws rotating in opposite directions. This separates for further reduction the coarser marl slip particles and rock fragments which might settle in the slip storage tanks. The coarse discharge from the classifier is carried by a scoop-type or snail feeder to the 8- by 10-ft. Allis-Chalmers ball mill used for preliminary raw grinding. This mill is loaded with 10,000 lb. of 2-in. 20,000 lb. of 3-in., and 20,000 lbs. of 3½-in. Sheffield Moly-Cop steel balls.

The product of the ball mill and the overflow from the Akins classifier go to separate sumps and 8-in. Morris slurry pumps and are discharged together over a pair of 4- by 6-ft. Allis-Chalmers "Utah" single-deck magnetic vibrating screens. The plus 16-mesh oversize from these screens flows back to the classifier and is reground. The fines (or slip) go into a tank from which an 8-in. Morris pump transfers them to the main marl slip tanks. This same setup is used about once a month to make clay slip. When this is done, a truckload of rock is used with every truckload of clay to provide grinding action. These slurry and slip pumps and all others in the plant are provided with Mine & Smelter Massco-Grigsby pinch valves on both intake and discharge sides to insure positive cutoff when closed.

In order to keep the kiln feed moisture as low as possible for efficient burning, a part of the marl slip overflowing the classifier goes to the ball mill in place of water.

There are four slip storage tanks, each 55 ft. in dia. by 24 ft. high, three being used for marl and one

Left: the 11½- by 26-ft. washmill designed for this raw material uses rock as grinding media.

Right: The 6- by 16-ft. two-deck screen which removes rock from the product of the washmill.

for clay. Each is equipped with a Dorr mechanical and air agitator, the air being provided by Fuller Model C110 rotary compressors. Two Morris 5-in. pumps feed the slip from these tanks to a pair of feed tanks in the final raw grinding department. These tanks have overflows, and a pump returns the overflow to the storage tanks. Each of the two feed tanks has a 36-in. Traylor ferris-wheel feeder driven by a variable-drive feeder with a tachometer which records on the raw mill control board. The marl and clay slips are blended in feeding to the spout of the final raw mill.

Final Raw Grinding The other three raw materials—limestone, dry clay, and sand—are reclaimed by the overhead crane from the storage building and fed to hoppers from which they can be fed as desired to the final raw mill. Three 8½-ft. dia. Falk table feeders discharge these materials in the desired portions on a 24-in. by 38-ft. belt conveyor, which in turn discharges into the mill.

This is an 8- by 29-ft. Allis-Chalmers Compeb mill which carries a 156,000-lb. load of Sheffield Steel Co. Moly-Cop steel balls. The load is as follows:

1-in.	62,000 lb.
1½-in.	30,000 lb.
2-in.	14,000 lb.
3-in.	30,000 lb.
3½-in.	20,000 lb.

No water is added to the mill other than that in the slip, and the slurry discharged from the mill averages about 48 percent moisture. Sometimes this drops as low as 43 percent, but it is never allowed to reach the 50-52 percent which is the maximum for economical and efficient operation of the kiln. The finished slurry has a fineness of about 78 percent through 200-mesh.

The slurry is discharged from the Compeb mill into a concrete tank which has high-and low-level Floatless controls controlling the operation of a 5-in. Morris pump feeding to the six 13,000-bbl. slurry storage and blending tanks. These are 22 ft. in dia. by 52½ ft. high, having conical self-cleaning bottoms and equipped with air agitation. A C110 Fuller rotary-compressor, controlled by a Caine Sales Company automatic timer, feeds air to one tank at a time.

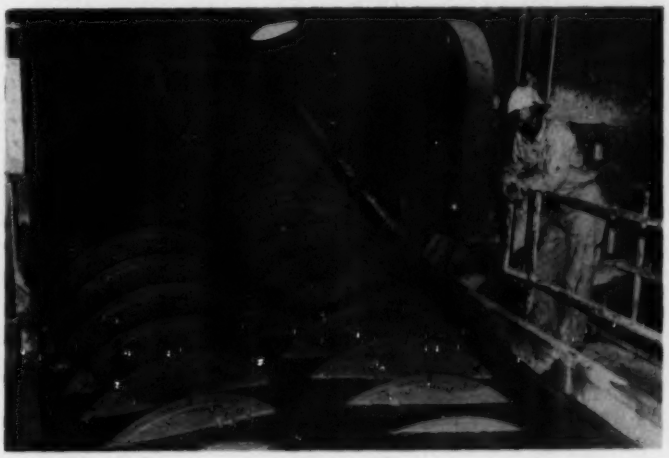
One of these tanks is ordinarily used for high-silica slurry and another for high-lime slurry, and blending is done in the other four tanks. The blended slurry is discharged by gravity from these tanks into two 55-ft. dia. by 20-ft. high kiln feed tanks, each equipped with Dorr mechanical and air agitators. A 5-in. Morris pump feeds from there to the Allis-Chalmers ferris-wheel kiln feeder, overflow going back to the feed tanks. The feeder has an Allis-Chalmers variable-speed drive synchronized with a generator on the kiln motor shaft.

Because of the provisions for storage of all raw materials ahead of the final raw mill, it is possible to operate this department largely during off-peak power periods. In this area the peak power rate period is from 7:00 a.m. to 9:00 p.m.

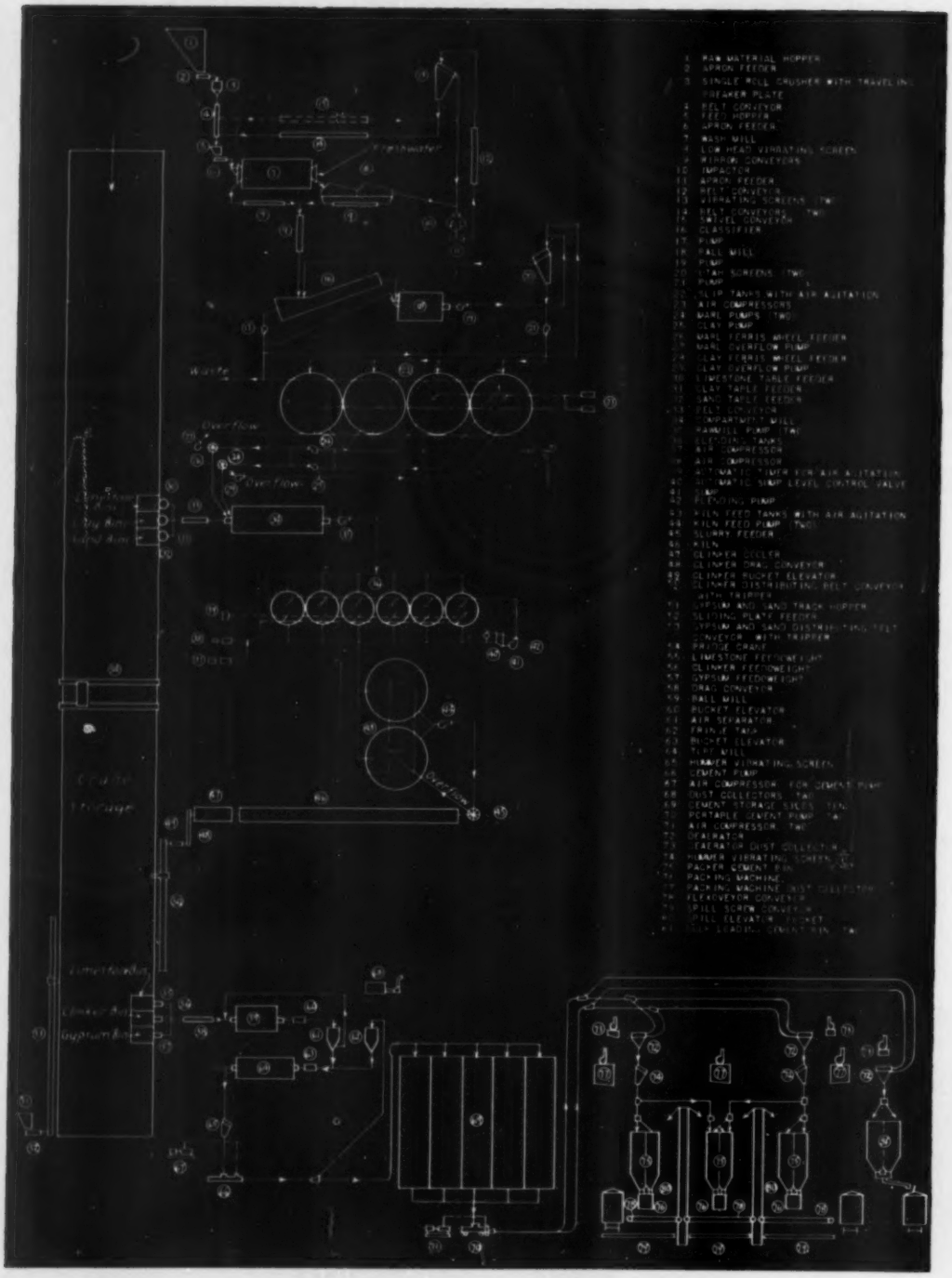
The reversible impact crusher which reduces the rock from the screen following the washmill.

Raw Material Control Because of the complex nature of the deposit, which actually contains 11 different types of material, the processing system of the plant had to be set up for four separate raw materials which have to be blended and mixed. These are: marl slip, crushed stone, clay, and sand. The regular method of making a four-compartment mix analysis on a calculating machine takes at least an hour. Sam Webb, assistant superintendent and chief plant chemist, felt that some other method could be found to do this job much more quickly and just as accurately. After much experimentation and considerable burning of midnight oil he devised a graphical method which comes up with the desired proportions in about 3 minutes. This method is described in detail by Mr. Webb in another article in this issue. This system is just as good for cements other than standard portland, which require only minor adjustments to the equipment. The different clinkers, of course, are isolated from each other.

Briefly, the procedure is as follows: The contents of each of the four marl tanks, a full day's supply, is analyzed separately. The limestone is so constant that it is analyzed only occasionally as a check. Only two of the four raw materials are ground at one time—marl and limestone, marl and sand, and marl and clay—and these are then blended as required by Mr. Webb's graphic method. The mill product goes to a sump with Floatless controls feeding to a pump which feeds to any of 6 blending tanks. Another pump can blend from any of these tanks into any other one for final blending. The two kiln feed tanks are fed from this one and are used in normal operation as one tank to eliminate the usual small errors due to transferring slurry, etc.



The double-screw classifier, which is the last stage in the raw-material washing and classification process.



The flow sheet of the plant, with a keyed list of equipment.

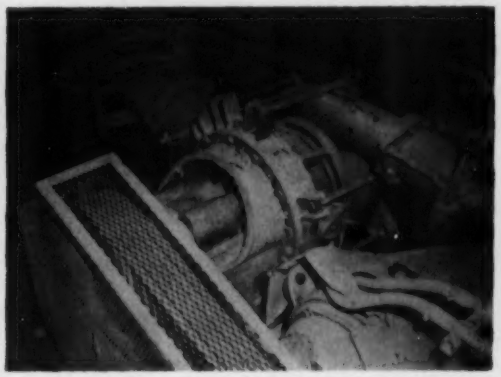
Burning The Allis-Chalmers all-welded kiln is 450 ft. long and 12 ft. in inside dia. and is mounted on seven tires. At its feed end it has a chain section for efficient heat transfer consisting of 1,000 chains each 15 ft. long suspended from the shell within a distance of 100 ft. This section lined with 5 ¾-in. Laclede Christy "Wallac" high-silica abrasion-resisting brick. For the next 175 ft. there is 6-in., Laclede Christy 40 percent alumina brick; then 60 ft. of 9-in. "Spallac" 40 percent alumina: then 50 ft. of 9-in. 70 percent alumina; 42¾ ft. of 6-in. Canadian Refractories "Magnecon" in the burning zone; and 9 ft. of 9-in., 70 percent alumina and 9 ft. of 9-in. "Spallac" 40 percent alumina at the discharge end. No insulation is used.

Standard Allis-Chalmers seal rings are used at both ends of the kiln. The dual kiln drive consists of two 125-hp. Westinghouse d.-c. motors connected by V-belts to the Falk 36.24 to 1 gear reducers, and then through a Steelflex flexible coupling to the spur and pinion gear drive. The kiln speed can be varied between 20 and 90 r.p.h. but from 60 to 65 r.p.m. is used. A standby Allis-Chalmers gasoline engine can be quickly connected up in an emergency. The Ward-Leonard system is used for synchronizing the speeds of the kiln and kiln feeder motors.

The kiln is controlled by a combination of visual and instrumental methods. The operator relies to a large extent on his sight and judgment, backed up by a Cambridge gas analyzer of the 3-component type, showing O_2, CO, and CO_2. This continually records on the kiln control board. CO is kept at the minimum, and the exit gas temperature at the rear end of the kiln is kept as close as possible to 500 deg. F. The kiln speed is varied, and the air and fuel are adjusted to maintain these conditions which have been found to be ideal for this kiln and raw material. A temperature of 2,600 deg., by the Rayotube radiation pyrometer, is maintained in the burning zone. Output at present is about 3,200 bbl. daily, although 3,400 bbl. has been reached; and eventually 3,600 bbl. per day is expected under ideal conditions.

The Allis-Chalmers kiln control board, a unit of the latest type, well arranged and lighted, is in a pres-

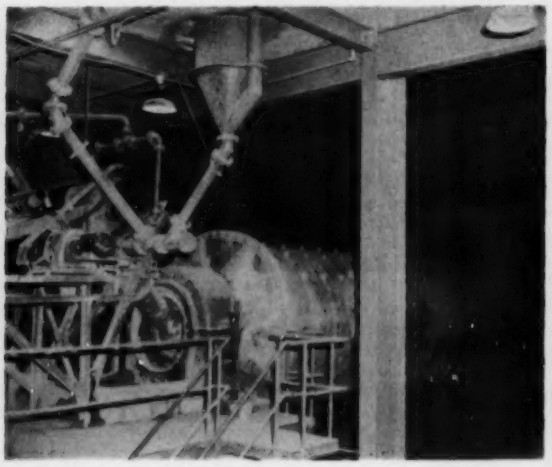
Above: The two 4- by 6-ft. magnetic screens which are in closed circuit with the classifier and the preliminary raw mill.

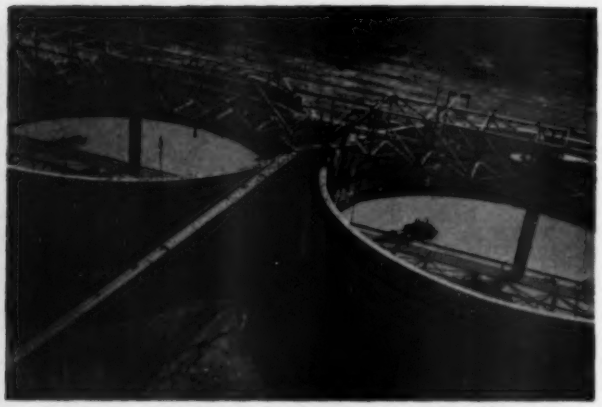


Above: The 8-in. slurry pump, with rubber pinch valves, which handles slurry from the raw mill.

Below: Two of the three 8-ft. dia. table feeders which measure the limestone, clay, and sand to the final raw mill from storage.

Below: The 8- by 29-ft. dia. mill used for final raw grinding, showing the feed of both dry and wet materials at the left.





Left: The six 13,000-bbl. slurry storage and blending tanks. The fresh and reclaimed water storage tanks are above the two center tanks.

Right: The two 55-ft. dia. kiln feed tanks, which are provided with mechanical and air agitation.

surized cubicle to keep out the dust. Among the instruments mounted on it are an electric counter on slurry feeder, a counter and a tachometer for kiln speed, a burning temperature recorder, draft gauges for rear end and hood, etc.

The fuel rate in the kiln is now about 1,390 cu. ft. of natural gas per bbl. per hour. This is 1,000-B.t.u. gas and is received at 425-lb. pressure. The United Gas Company reduces this at the plant to 20 lb. The gas comes from the company's main line only three miles away which brings it from a field in Mississippi only 60 miles from Jackson. The burner nozzle design was developed by company personnel and first used at the Des Moines, Iowa, plant. It is a two-piece nozzle tapered inside, with holes leading from the outer high-pressure annular passage to the inner low-pressure pipe, creating turbulence which decreases the velocity of the gas flow and thoroughly mixes the gas and air.

The kiln draft is controlled by a set of louvre dampers at the rear end which are operated electrically from the control board. Indicators on the board show at a glance how they are set. The gases flow from the kiln into a dust chamber and then throught the Boyley draft fan to the stack. The dust chamber collects about a truckload of dust weekly, and there is very little stack loss in spite of the fineness of the raw material. This is attributed to the use of kiln chains and the high moisture content of the raw material. The stack is 6 ft. in dia. and 75 ft. high and is made of ¼-in. rolled iron with no lining.

Clinker Cooling Following the kiln is a 7- by 44-ft. Fuller inclined grate clinker cooler which has a capacity of 4,000 bbl. per hr. This reduces the temperature of the clinker to about 200 deg. F., and the desired operating conditions are automatically maintained. A thermocouple records on a potentiometer which controls the motor and Reeves variable-speed drive operating the cooler fan, speeding it up as the cooler discharge gets hotter, and *vice versa*. On the hot air line from the cooler to the kiln are a Multiclone and a damper which tempers the air going to the kiln. The desired conditions are maintained by a Foxboro automatic control. The cooler is provided with windows and lights inside for inspection. A removable window makes cleaning possible during operation.

At the discharge end of the cooler a bar grizzly passes all large chunks through a hammermill-type crusher. An 18-in. drag chain conveyor and Link-Belt bucket elevator feed the clinker to the storage building, where it is distributed to storage by a 24-in. belt conveyor with a tripper.

Storage Building The storage building is entirely of concrete construction and is 465 ft. long with a 100-ft. span. In separate compartments it stores 50,000 tons of limestone, 100,000 bbl. of clinker, and adequate tonnage of gypsum, dry clay, local river sand, and masonry rock. There is also space for iron ore if this is ever needed. The sand and gypsum are received in cars and discharged into a track hopper. A 30- by 72-in. McLanahan & Stone sliding plate feeder discharges these materials on a 24-in. belt conveyor with tripper which feeds into the storage building.

Serving the entire storage building is a P & H 8-ton overhead traveling crane with a Blaw-Knox 7200 clamshell bucket. This not only distributes and rehandles the above materials in storage but also reclaims them to the various bins feeding the raw- and finish-grinding mills. Should the plant be enlarged, a second crane can be readily installed.

Clinker Grinding The final cement ingredients—clinker, gypsum, and masonry limestone chips—are fed from the storage building into three ton bins. Under each bin is a Merrick Feedoweight having variable-speed controls which make it possible to blend these materials accurately to any desired specification. A ferris-wheel feeder has been used for adding liquid admixtures, but a "Moyno" pump is being installed to do this more accurately. A Mixing Equipment Company "Lightning" mixer is used for preparing the admixtures.

All of the cement ingredients are discharged on an 18-in. by 50-ft. drag chain conveyor which feeds to the 10½- by 15-ft. Allis-Chalmers ball mill. The ball load of this mill consists of 10,000 lb. of 1½in., 55,000 lb. of 2-in., 45,000 lb. of 3-in., 15,000 lb. of 3½-in., and 10,000 lb. of 4-in. Sheffield Moly-Cop steel balls.

The finish-grinding department is so designed that any one of four

flows can be used. The one now in use is considered the best for standard portland cement. In this flow the product of the ball mill goes via a Fuller-Huron Airslide to a bucket elevator which feeds the 8- by 32-ft. Allis-Chalmers finish-grinding tube mill. The ball load of this mill consists of 80,000 lb. of 7/8-in. and 80,000 lb. of 1-in. Sheffield Moly-Cop steel balls. Its product is carried by an Airslide to a bucket elevator feeding via another Airslide to a 16-ft. Sturtevant mechanical separator. The tailings from the separator are returned via an Airslide to the ball mill in closed circuit, and the separator product is finished cement. In this flow the two mills are treated as one unit. An alternative is to split the tailings to the two mills. These flows maintain a comparatively low circulating load and tend to hold down surges in the separator.

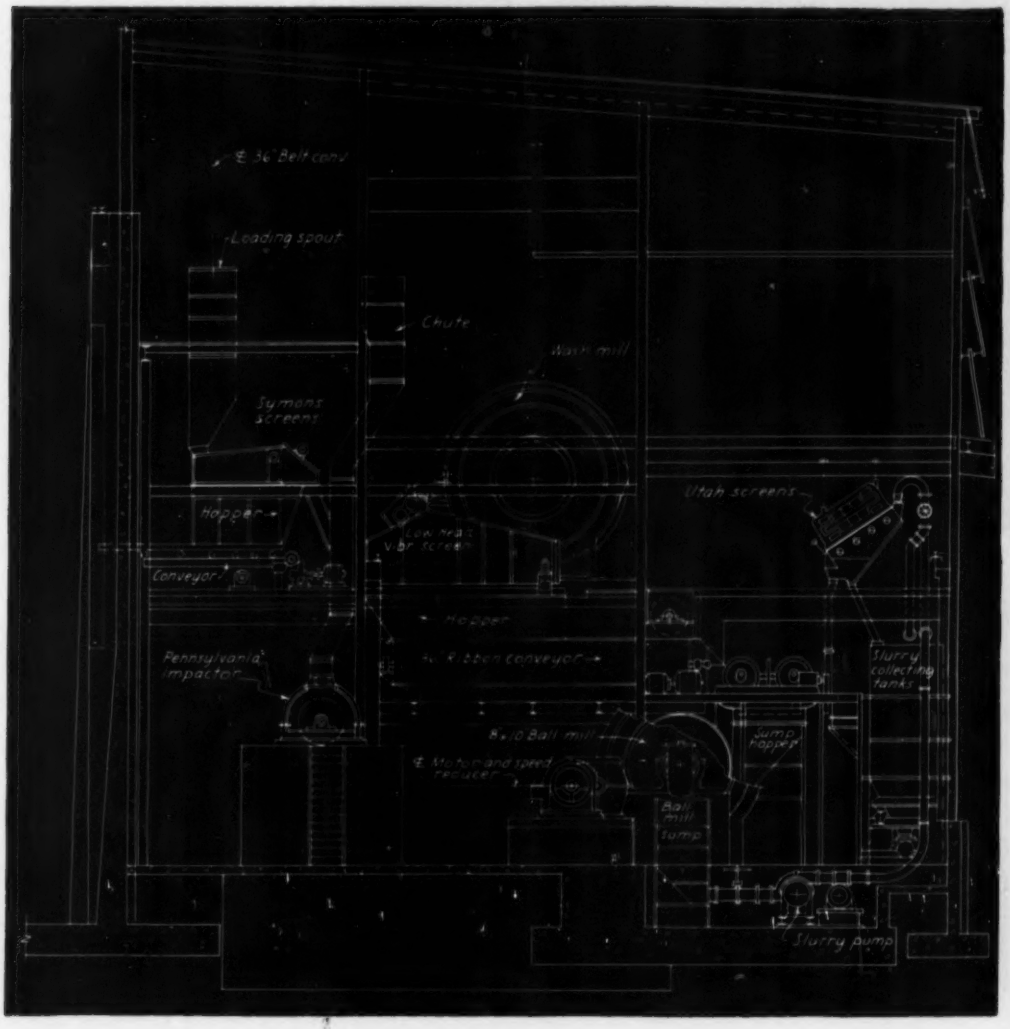
A second optional flow is to operate the air separator in closed circuit with the ball mill and discharge the separator fines via an Airslide to the elevator to the tube mill for finishing in open circuit. In this flow another Airslide is used to feed the elevator to the separator.

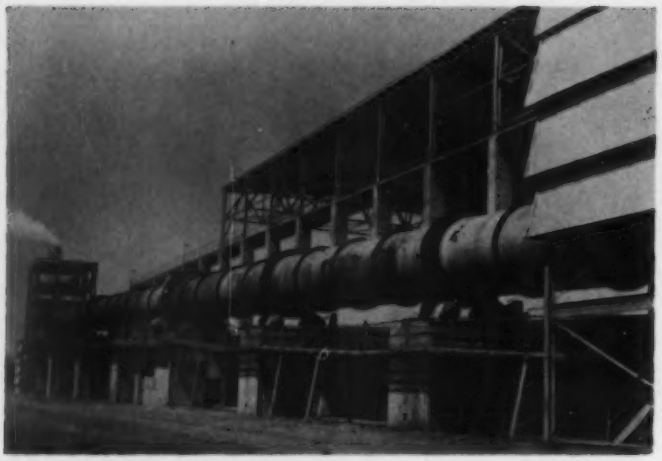
A third option is to operate the ball mill in open circuit and discharge direct via an Airslide to the elevator to the tube mill which is in closed circuit with the separator.

A cross-section of the raw material washing and classifying department.

The fourth option is to run both mills in open circuit without the separator. For emergencies the ball mill only can be operated, in closed circuit with the separator. The change from one flow to any of the others can be made almost instantaneously by throwing a few switches. In each flow the finished product, from the separator or from the tube mill, is carried by an Airslide to a Tyler Hum-mer screen over the cement pump. This has 3/16-in. cloth for removing any spitzers (ball fragments).

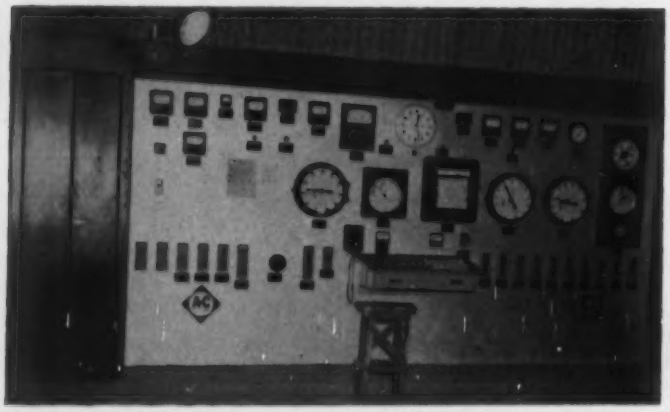
The Northern Blower Company's patented dust-collecting and cooling system is installed in this department; it can be used in all closed circuits except No. 4. In this process



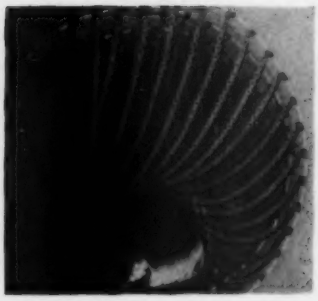


The 12- by 450-ft. rotary kiln, viewed from the firing end.

The kiln firing hood, with a special type of gas burner and radiation pyrometer.



The control board, housing all instruments, etc., for the kiln, cooler, and related equipment.



A view inside the kiln, showing the suspended chains for efficient heat transfer.

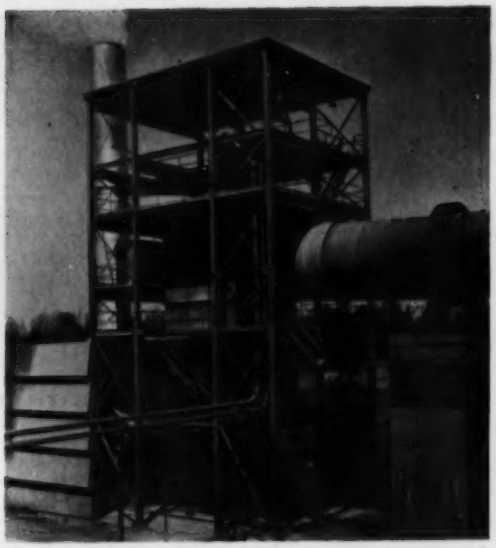
ambient temperature air is drawn into the inner cone of the separator, where it comes into intimate contact with the cement particles as they are falling through the air stream. This air is then drawn through the separator along the path of the finished particles and is exhausted from the hopper of the outer cone of the dust arrestor. The two mills in this department are so constructed that a sizable volume of air can be drawn through them for cooling; 3,000 c.f.m. is being drawn through the ball or primary mill and 4,000 c.f.m. is drawn through the tube mill. The volume of air that is being drawn through the separator is 4,000 c.f.m., making a total of 11,000 c.f.m. directly cooling the grinding circuit. This system lowers the temperature of the finished cement 35 to 40 deg. F.

Some provision has also been contemplated for heating the inlet air to the separator during high moisture periods, but up to now the system has been able to absorb all the moisture present in the clinker.

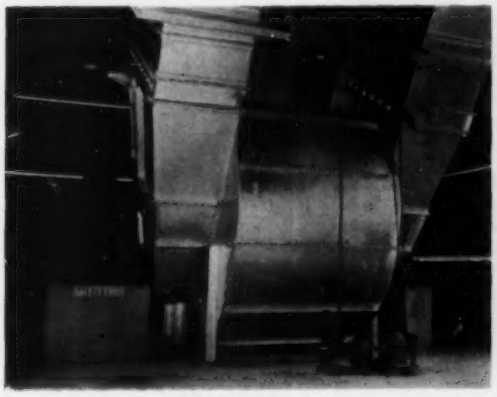
Both the raw-material and clinker-grinding departments are in charge of one operator and a helper. The controls for both departments are on one central board. All of the four mills are direct-driven by Westinghouse synchronous motors: the raw ball mill by a 300-hp. motor, the raw compartment mill by a 700-hp. motor, the finish ball mill by a 900-hp. motor, and the tube mill by an 800-hp. motor. The three last-mentioned motors are located in a separate room which also houses m.g. sets, switchgear, etc., and which will also be used in part as a repair shop. This room is pressurized by a Bayley Size 600 fan and filter to keep out dust.

Cement Storage and Packing A 7-in. Fuller-Kinyon Type H pump conveys the screened finished cement either direct to the cement storage

Above: The dual kiln drive, with auxiliary engine drive at the right for emergency use.

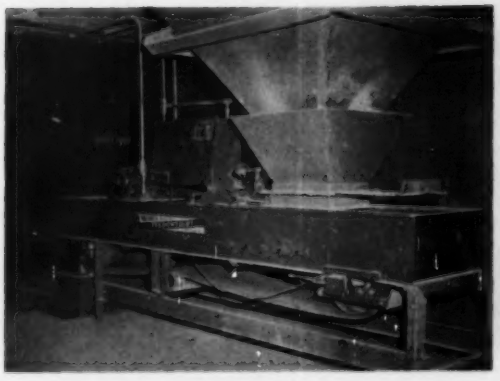


Right: The feed end of the kiln, with the dust chamber, the fan, and the 75-ft. steel stack.

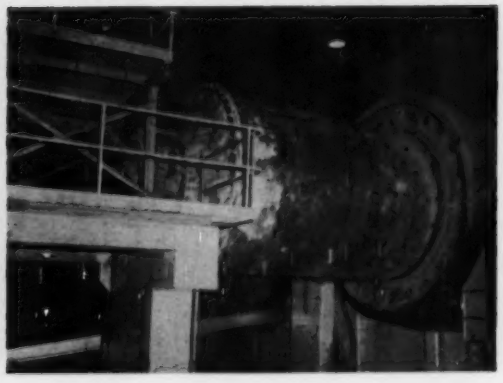


The fan which furnishes draft for the kiln.

The inclined-grate clinker cooler following the kiln.



The scale which measures out clinker to the finish-grinding mill.



The 10½- by 15-ft. ball mill used for preliminary clinker grinding.

Left: The 16-ft separator which operates in closed circuit with the clinker grinding mills.

Right: The dust collector connected to the clinker-grinding circuit, which is also used for cooling.

silos or to a 900-bbl. fringe tank which is used to prevent contamination when making a changeover. After the changeover cement can be dribbled from the tank via an Airslide back to the tube mill feed elevator to grind in with new product. This system eliminates the usual 2-hr. cleanout between changes and eliminates contamination, which is especially serious when a changeover is made from standard to masonry cement or *vice versa*.

The ten cement storage silos, each holding 10,000 bbl. of cement, are arranged in two rows. The interstices are not used for storage. These silos are of the conical steel self-cleaning type similar to those at the Des Moines and Oglesby plants (see PIT AND QUARRY, July, 1949, p. 91). Under each row of silos is a Fuller-Kinyon 8-in. Type H_2 self-propelled pump mounted on rails which connects to the silo discharge opening with a quick-acting coupling. Air for these pumps is supplied by two Fuller C250 rotary compressors.

For bulk loading of cement into hopper cars, the cement from either pump goes to a 5-ft. dia. de-aerator fitted with a Sly No. 10 Type C Dynaclone 2100-c.f.m. dust collector and into two 800-bbl. loading tanks, each of which has two compartments, making it possible to store four different cements. The collector dust also goes into these tanks via an Airslide. A Fuller Airfeeder and an Airslide load the cement into cars at the rate of 400 bbl. per hr. When a car is in position for bulk loading, it is on the platform of a Fairbanks-Morse 300,000-lb. capacity track scale. It is first weighed empty and can then be loaded with exactly the desired amount of cement. About 60 percent of the output of this plant is now shipped in bulk.

For packing into bags, the lines from the two pumps feed to two identical packing circuits. In each circuit the cement first goes to a 5-ft. dia. de-aerator, to which is also connected a 2100-c.f.m. Sly No. 10 Type C Dynaclone dust collector, and then to a 4- by 5-ft. Hum-mer screen which removes any foreign matter. An Airslide then feeds to either of two 350-bbl. bins over the St. Regis Modern 4-tube packer. The collector dust also goes into these bins via an Airslide. Between the two packers served by these two flows is a third packer which is used only for masonry cement. It can be fed from the screen in either flow into either of its two 350-bbl. bins. Feeders under these bins are electrically controlled, so that only one can operate at a time. With this arrangement four different cements could be stored over the two end packers, in addition to the masonry cement over the center packer, all with no danger of contamination. The switch from one bin to the other can be made in one minute by merely cleaning out the packer. Each packer has a capacity of 1,400 sacks per hour.

Each packer has its own 8,000-c.f.m. Sly No. 9 Type A Dynaclone dust collector from which the cement is returned to the proper bin via an Airslide. The spill from each packer goes via an Airslide to an individual 9-in. screw conveyor, and two bucket elevators serving these screws automatically feed the cement back to the bin from which it was drawn.

The bulk and bag packing circuits are controlled from a central

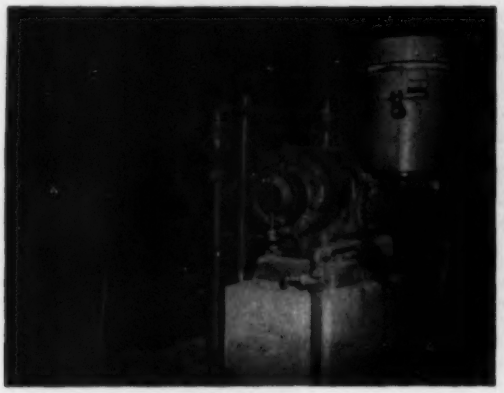
The magnetic screen which removes any foreign matter from the cement before it goes to the pump (below) and to storage.

board which is almost human. Like other boards, it has lines connecting the machinery units in the flow which are represented by lights. Instead of having buttons below the board for each unit, however, these buttons, controlling valves, are located on the board at the proper point in the flow. When a button is pushed, its light does not go on until the valve actually moves. This insures that a valve is in the desired open or closed position before the next one is moved, and makes the board a positive indicator of the actual flow.

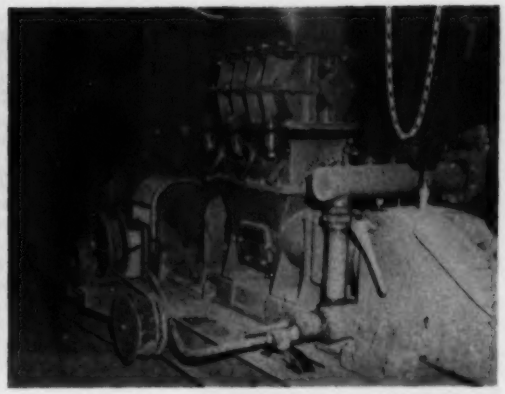
The loaded bags of cement are handled by a three-unit Flexoveyor conveyor system with one conveyor under the center packer and one extending from the other packers to the two sides of the building. All conveyors are reversible, so that all can feed in either direction, two in one direction and one in the other etc. From the two ends of this conveyor system hand trucks are used to load into railroad cars. No truck loading is done at present, but additional conveyors are planned for that purpose. This plant is served by the Jackson-Meridian branch of the Illinois Central Railway.

Electrical Electric power for the plant is purchased from the Mississippi Power and Light Company. A 110,000-v line brings power to the plant site, where two 4,000 kv.-a., 3-phase OA transformers reduce the voltage to 4160 volts for the plant distribution system. The kv-a. rating may be increased to 5,000 per transformer by forced cooling if future loading demands it.

Power from these transformers is fed into indoor heavy-duty, metal-clad 5-kv. switchgear which employs De-ion type air circuit breakers for incoming lines, outgoing feeder circuits, and motor starters for several induction and synchronous motors



The rotary compressor which supplies air for the cement pump to storage.



The 8-in. movable pump, which feeds cement from one row of silos for bulk or bag loading.

ranging in size from 250 to 900 hp.

There are four out-door substations within the plant, one each for the packing building, the kiln, the water system, and the mill and crusher buildings, which total 4500-kv.-a., 3-phase rating and which serve to reduce the voltage to 480 volts for the power supply of all a.-c. motors rated 200 hp. and smaller. These transformer banks are connected to groups of metal-enclosed, indoor switchgear which employ 600-volts, De-ion type air circuit breakers of draw-out construction.

The controls of low voltage motors are grouped into a number of control centers strategically located in the various departments. Lighting transformers and No-Fuze lighting panelboards are also built into the control centers. The push-buttons, selector switches, and indicating lights for product flow control were congregated on vertical benchboards for operating convenience. All machinery is electrically interlocked for automatic sequence starting and for stopping in case of an emergency.

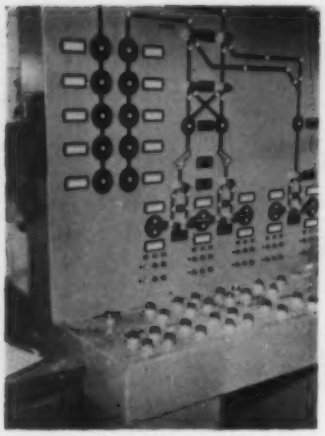
The kiln is driven by a special adjustable voltage d.-c. drive consisting of two induction motor-generator sets and two 125-hp. d.-c. motors. The d.-c. generator and motor armatures are all connected in a series loop for normal operation. Switching means are provided to cut out any of the armatures in the event of machine trouble. Each m.-g. set and associated control is enclosed in a floor-mounted cabinet with provision for forced ventilation. To guard against the possibility of shutdown from complete failure of electrical drives, an emergency gas engine has also been provided.

Design and Construction The plant is built entirely of concrete, concrete blocks, and steel; in fact, nearly the only wood used is wooden piling. The soil-bearing value at this location was found to be too low to support concentrated loads, so all silos, slurry tanks, and kiln piers are supported on wooden piling. Spread footings are used everywhere else. An unusual feature is the use of louvred asbestos cement walls on the crusher, mill, and kiln buildings to provide adequate ventilation. This follows practice in tropical countries.

The general and detailed design of the entire plant must be credited

Right: Looking down on the bulk-loading building, one sees the cement lines from the silos, the de-aerator, the dust collector, and storage tanks.

Below: The air conveyor used for loading bulk cement into covered hopper cars.



The control board in the packhouse, which controls and indicates all movements of cement.

to the Marquette engineering department, headed by Jens Holm, chief engineer; but invaluable help was also received from the other company departments, including operating, technical personnel, and from the various manufacturers who supplied equipment. The Crosby Construction Company did all the concrete work and set all the machinery. Most of the major equipment was supplied by the Allis-Chalmers Mfg. Company and most of the motors and electrical equipment by the Westinghouse Electric Corp. Fuller-Huron Airslides are used for conveying wherever possible throughout the plant, and the Fuller Company also supplied the clinker cooler, the cement pumps, all the compressors, and other equipment for this plant. Falk speed reducers and motor reducers are used throughout.

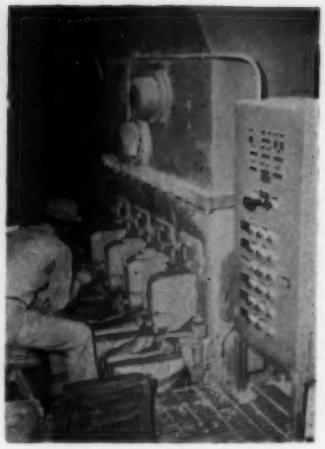
The general office building at the plant also houses the plant laboratory, a conference room for safety meetings, etc. It is built entirely of concrete, with concrete block walls and ceilings and roof of concrete block and transverse reinforced poured concrete beams.

Laboratory The laboratory has all the latest standard equipment for chemical and physical control tests and other necessary work. The all-metal laboratory furniture was supplied by the Metal Equipment Company Hicksville, L. I., New York. A high-temperature furnace makes clinker buttons from the raw mix. These are analyzed, saving many steps in the usual analysis methods and considerable time. The Blaine (Precision Scientific Co.) permeability method is used for making surface area determinations as this is believed to be faster than other methods, and just as accurate.

The laboratory staff consists of eight men, including the following: Sam Webb, chief chemist and assistant superintendent; two chemical analysts; a physical tester; and four shift men or mix chemists, at least one of whom is always on duty. The latter do their own sampling and blending tank analyses and also make complete analyses. Every two hours samples are taken of the clinker, finished cement, marl slip, kiln feed, and raw mill product.

Miscellaneous There are also separate modern wash and change houses for the white and colored help. Water coolers are also provided at various points in the plant, a feature much appreciated by the workers in this warm climate.

The water for most purpose is obtained from a 1600-ft. well by a 380-g.p.m. Layne & Bowler-Memphis deep-well pump. There is also a Fairbanks-Morse centrifugal fire pump with separate lines to hydrants in all parts of the plant. The reclaimed water from the washmill sump is used for sanitary purposes and for cooling bearings, etc.



One of the three packers, with the control board and bin-level indicators.

One might think that a new plant starting up in an area where there is comparatively little industry would have difficulty in obtaining suitable help. Just the reverse was actually the case, however, and company officials feel that the caliber of its employees is comparable to that of any of its other plants. Except for a few key men from its other plants and offices, Marquette hired local people who had no previous experience at such work. They are mostly farmers who, in line with the trend in this area, have converted from cotton to cattle raising. This type of farm work can be done in spare time, and they are glad to take industrial jobs.

Each of three bag-packing circuits is connected to a de-aerator and dust collector.

Sacked cement discharging to hand trucks for loading into cars.

Report on Current Labor Developments

By S. HERBERT UNTERBERGER

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Industrial & Labor Economists
Washington, D. C.
Philadelphia, Pa.

The steel conflict continues to dominate all other labor developments; and even if there were a relatively quick settlement, the effects of the strike will be felt for a long time. Many employers who do not think they are closely related to the dispute in Pittsburgh, Gary, and Birmingham will find that those problems have spilled over and affected their own businesses. This is likely to occur in two ways.

The first effect of the steel trouble will be evident in terms of employment elsewhere. Starting with the announcement of the Ford Motor Company that shortages in steel will require them to make substantial layoffs, there has been a series of similar announcements by many other employers. Many businessmen who thought they had insulated themselves against the effects of a steel strike by keeping a supply of steel (generally as much as 30 days' worth) on hand are finding that that supply is rapidly dwindling and that it will take longer to fill up the pipeline than they had originally anticipated. An employer would have had to have exceptional foresight to predict demand, as well as a supply of each particular specialized type of steel or parts made of steel to keep his business going without some bottlenecks.

The second important way in which the steel conflict will affect other employers, even in remotely related or totally unrelated industries, is the pattern-setting aspect of any very large drawn-out and well publicized steel dispute. It will be remembered that the size of the immediate post-war increase for practically every employer in the United States was set by the 18½-cent wage increase given in the steel industry. Moreover, the spread of collectively bargained pensions and health and welfare programs began with their adoption in the steel industry as a result of a fact-finding procedure, followed by a strike. The final settlement in this year's steel dispute is almost certain to establish goals for other organized workers which they are going to do their best to attain.

Because so many people, both employers and labor unions, are holding up their own wage negotiations to see how the steel dispute comes out, there are probably more open contracts around the country at the moment than every before. The final settlement of the steel dispute will result in great pressure to settle all of those other wage bargains. In many cases settlements identical or closely related to the settlement in steel are sure to result. This is likely to happen in a very wide variety of industries.

Many employers who have had their own contract negotiations halted or postponed while the steel industry fights off not only the union but also the government will find that this will cost them a very high price. This will occur for two reasons. First, once a substantial pattern has been set, it becomes difficult and in many cases impossible to make settlements for smaller amounts even though, based on the employer's special situation, a lesser settlement is more appropriate. Second, when wage negotiations are postponed, the final agreement is generally made retroactive to the contract expiration date. It is not unusual for employers to fail to set aside adequate sums to take care of this retroactive bill. Furthermore, many of the products for which the wage bill has been subsequently increased have already been sold at prices which were not increased. The loss can never be recovered.

While most businessmen are in sympathy with the steel industry's fight, they may discover that that fight has cost them a lot of money. From the standpoint of their own business only, it is likely that they would have been better off if the steel case had been settled quickly, even at the very high terms set by the Wage Stabilization Board.

Management Rights Upheld

The Supreme Court, in a recent decision, reversed a long-time trend of chipping away at what management regards as its prerogatives. In a case in which management was accused of refusing to bargain in good faith because it insisted that it would not bargain with the union with regard to certain matters, the Supreme Court upheld the management's position.

Of special importance is the fact that the decision was written by Chief Justice Vinson, who—at least during the period when he was a government official—was generally regarded as friendly to trade unions. While it was never specifically said, the general approach to the question of what is "a refusal to bargain" was that bargaining required not only the making of offers and counter-offers, but also the making of concessions. The Supreme Court made it very clear that the National Labor Relations Board may not "either directly or indirectly compel concessions or otherwise sit in judgment upon the substantive terms of collective bargaining agreements". The Supreme Court pointed out that the company had demonstrated that it was bargaining in good faith by its willingness to meet many times with the union and to accept proposals from the union and make counter-proposals.

It is unlikely that even with this decision, employers will be able adamantly to refuse to discuss certain matters at the bargaining table, but it appears that if the matters deal with a basic question of an employer's ability to manage his business efficiently and profitably, a refusal to bargain away any of those powers will not be regarded as a violation of the law if it is abundantly clear that he has acted in good faith in regard to bargaining as a whole.

Industry's Position on Loosening Wage Controls

The Wage Stabilization Board's recent action of loosening controls over collectively bargained "health and welfare plans" called forth a statement from the industry members of that Board which clarifies greatly their position on the whole subject of wage controls. A significant part of that statement reads as follows:

"Emphasizing that the newly-adopted regulations in the 'welfare area', with their far-reaching inflationary potential would seriously weaken the basic aims of the Defense Production Act, the Industry members recorded the following objections:

"1. Increases in payroll costs for health, welfare, and benefit plans will result in an inflationary spiral of higher prices for every American.

"No attempt is made to provide some top limit to welfare benefits, which could run into relatively heavy expenditures, enhanced by possible waves of new plans and expansion of existing ones.

"2. Shifts from contributory to

(Continued on page 121)

Direct-Firing Coal Mills Important Part of Plant Improvement Program

ON THE SPOT

THE North American Cement Corporation operates three cement plants—at Security, Md., Catskill, N. Y., and Howes Cave, N. Y.—all of which were built in the early days of the cement industry. As the years went by, these plants were improved and expanded; but before and during the war years little was done to them. Two years ago a multimillion-dollar improvement program was inaugurated in order to modernize these plants and lower production costs, but with only moderate increases in capacity. This program included new kilns, new grinding mills, modernized quarry haulage systems, etc.

At the Security, Md., plant the first steps in the program were the replacement, a year ago, of the locomotive and car haulage system with Easton semi-trailers drawn by Mack diesel tractor units. The central coal mill, which had dried and ground the coal for the five kilns, was replaced at the same time by five direct-firing coal mills. Recently a new raw-grinding mill was installed, and a new clinker-grinding department is near completion. These additions were made primarily for greater economy and efficiency, and the capacity of the plant remains unchanged.

The central coal mill at this plant was dusty and dangerous, and the original equipment in it had depreciated to the point where upkeep was high and complete replacement was becoming necessary. After careful study it was decided to go along with the modern trend toward individual direct-firing coal mills for each kiln. Strong-Scott Unipulvo Size D60 coal pulverizers were selected, primarily because their compactness would not require enlargement of the kiln building; they went into operation during the period from April through June, 1951. The usual adjustment period was necessary before these mills were giving peak performance, and they are now doing a difficult job very satisfactorily. In every way they are an improvement over the old methods.

The five Reeves dry-process kilns are identical. Each is 125 ft. long, with a diameter of 8 ft. for 75 ft. at the feed end, a 10-ft. taper section, and a 10-ft. diameter for the last 40 ft. at the discharge end. Each kiln has a capacity of 1,000 bbl. daily. A Leeds-Northrup Ray-O-Tube in the kiln hood records the burning temperature on a Micromax recorder. The 1,500-1,600 deg. F. exit gases go through a common flue to four 1,006-hp. Edgemoor waste-heat boilers. Two 3,000-kw. turbo-generators make as high as 144,000 kw.-hr. daily, with all five kilns in operation, supplying nearly all the plant power requirements. The clinker from these kilns is discharged into 5- by 16-ft. Fuller inclined-grate coolers and is then carried to storage by drag chain conveyors.

One of the coal mills, with a thermocouple (in the coal feed pipe to the kiln) which controls mill operation.

A perspective view of the five direct-firing coal mills in the North American Cement Corporation's plant at Security, Md.

The coal is discharged from cars into a hopper, from which a Jeffrey vibrating feeder discharges it into a 24-in. Jeffrey roll crusher. A series of two inclined belt conveyors and a screw conveyor feed into the five 15-ton coal-feed tanks. From each bin the coal is fed by gravity to the reciprocating feeder shoe of the mill which pushes the coal into the mill. This feeder operates at constant speed, but the rate of feed can be varied by adjusting the stroke. The coal goes directly to the grinding chamber with its centrifugal swing hammers. No grates are used, and the mill is air-swept, the fine coal being sucked up through an internal classifier. The coarse material drops back into the grinding chamber. The

The drive side of one of the five direct-firing coal mills, with the coal bin and feeder at the left.

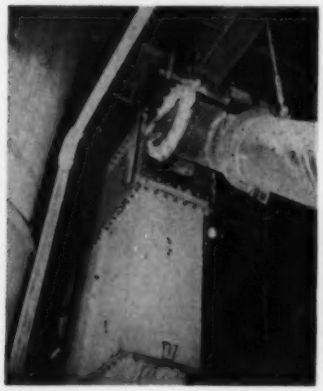
fine coal is sucked out through a fan and the burner pipe into the kiln. The suction of the same fan draws hot air from the kiln hood into the mill, drying the coal while it is being ground. Because they operate under suction, these mills are practically dustless.

Every possible automatic control is used to maintain uniform operating conditions in the mills. It has been found that best results are obtained with a primary air temperature of 200 deg. F. going into the kiln, and other conditions are automatically adjusted to suit. In the coal feed pipe to the kiln there is a thermocouple which is connected to a Brown potentiometer pyrometer. This regulates the flow of compressed air to an air motor which operates a cold-air damper on the hot-air pipe from the kiln to the mill. As the moisture in the coal varies, the amount of heat required to dry it also varies and the cold-air intake is automatically adjusted to suit. The temperature in the mill varies from 300 deg. F. for dry coal up to 600 deg. for very wet coal. Thermometers on the intake and exhaust pipes of each mill register the temperature of the air entering and leaving it. Each coal mill, with its fan and feeder, is driven by a 75-hp. motor.

There is no way of measuring the coal input to each mill, but the total consumption for the plant has been 1/5 lb. per bbl. This is high-volatile 13,600-B.t.u. West Virginia coal with an ash content of 7 to 9 percent. This fuel rate is about the same as with the old central coal mill, but in recent years the quality of the coal has been going down. It is finer and wetter, with a moisture content of up to 10 percent. The capacity of the kilns is also unchanged; but burning conditions are better than formerly, and the clinker is of excellent quality.

At first the wear on the pulverizer hammers was very severe and they only lasted about 12 days under the worst conditions. The wet, low-grade coal available is one reason for this. Another is the fact that the short dry-process kilns with their tapered sections make for a dusty operation, and the amount of clinker dust drawn through the mill with the dust is quite heavy. Various types of metal are being experimented with, but best results have been obtained by installing dust collectors in the hot-air lines from the kilns. A small home-made cyclone-type collector was first installed on kiln No. 3, and results were so satisfactory that a larger unit was installed on kiln No. 2. This is a Western Precipitation Corporation Multiclone—Type 9 VG, Size 10-5—consisting of two rows of five cyclones each. No record of the amount of dust collected has been kept, but the life of the hammers has been nearly doubled, to the minimum of 21 days under the worst conditions. The wear on other parts of the mill has also been greatly reduced.

In any plant with direct-firing coal pulverizers using kiln heat for drying the use of wet coal presents a problem when a kiln is down and shuts off the source of heat. In this plant a special reserve storage of dried coal is maintained for such an emergency, and an oil torch supplies heat until the kiln is well under way.



Left: Looking up at the dust collector ahead of the coal mill for kiln No. 2. Above is the air motor which operates the damper on the pipe shown, which leads to the mill.

Right: The control board for one of the kilns and coal mills, with the pyrometer above indicating 200 deg. F. air going to the kiln, and the recorder below showing the burning temperature via optical pyrometer.

Labor Developments

(*From page* 119)

non-contributory plans will release increased consumer purchasing power with its inflationary impact on prices, credits, and money supply.

"Pressures will be exerted to reduce or entirely eliminate employee contributions under existing plans, bringing about an indirect wage increase.

"3. Where increased payroll costs are absorbed by the employer and not passed on in price increases, the subsequent reduction in net taxable income will inflate the economy through reduction in tax receipts by the Treasury.

"This undesirable reduction of revenues from federal income taxes levied upon employers will further increase the inflationary spiral.

"4. Adoption of the proposed regulation will result in the violation of the entire Board policy of preserving historical relationships including the concept of area and industry practice and will substitute a policy of national patterns.

"Establishment of fixed national patterns is contrary to American tra-

(*Continued on page* 123)

Hollow-Flight Screw Conveyors Cool Clinker At Monolith's California Plant

ON THE SPOT

THE cement industry has been operating at or near capacity in recent years in an attempt to keep pace with the clamorous demands of the construction industry. For the most part, finished cement barely has time to "hit the silos" before it is on its way to the job.

By H. F. UTLEY

As a result, cement occasionally reaches the job at relatively high temperatures. On one mass-concrete project up in the Pacific Northwest with which the writer is familiar, cement—even after a 100-mi. truck haul—tested in excess of 200 deg. F. upon arrival at the batch plant!

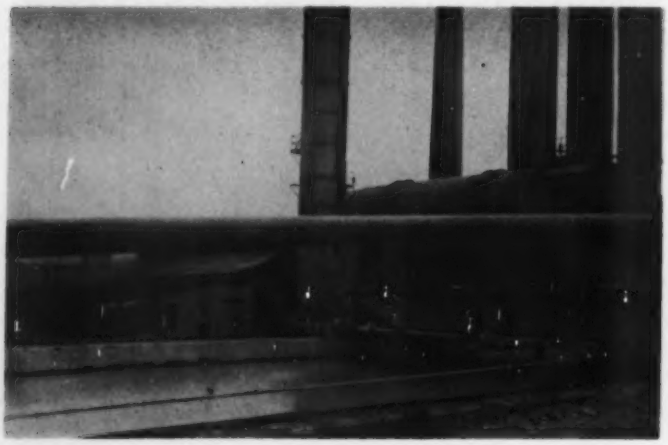
In addition to the oft-cited objections to using hot cement in concrete, the cement manufacturer, too, has considerable cause for concern, since the grinding of clinker at temperatures in excess of 100 deg. often generates static electricity, with consequent excessive coating of the grinding balls in the finishing mills; this condition may result in reduced output and increased power requirements. The heat likewise has a detrimental effect on the gypsum retarder, premature stiffening of the cement upon hydration being the most serious result.

When the Monolith Portland Cement Company, Monolith, Calif., undertook the enlargement of the finish end of its plant in 1950, officials decided to rule out such an eventuality by employing equipment which, despite the tempo of production schedules, would insure properly-cooled clinker at all times. In designing the cooling facilities, J. D. Christian of J. D. Christian Engineers, San Francisco, brought to the attention of President Coy Burnett a new heat-exchanger method of clinker cooling which, although untried in the cement industry, held forth a good deal of promise. It involves a screw-conveyor system which differs from the conventional in that both shafts and spiral flights are hollow to allow for the circulation of cooling water. The system had been used successfully to cool cement on several dam jobs in the West and in the salt, sugar, and chemical industries. In the Monolith installation, operating on hot clinker, it was proposed that three sets of Holo-Flite screws be placed in the finish-grinding circuits, two ahead of the mills and one to handle air-separator tailings returned for regrinding. Results were so uniformly good, however, that a third unit in the return circuit proved unnecessary.

A general view of the Monolith plant, located between Mojave and Tehachapi, about 125 miles north of Los Angeles.

Because some pioneering was required, the two Holo-Flite assemblies were originally enclosed in water-jacketed troughs as a further aid in cooling the clinker. It was soon revealed, however, that the heat exchange actually was effected almost entirely by the circulation of the cooling water through the shafts and flights alone, so the jackets were eliminated.

A study of abrasive wear in the flights after some leakage had developed prompted a change in the design and welding technique. Outer edges of the spirals were extended and a method of hard-facing the flights 1½ in. down from the edges



This view shows one of the kilns with its dryer above and ahead of the kiln. The slurry basin and the traveling agitator are in the foreground.

One of the multiple-screw hollow-flight cooling conveyors, with the cover sections removed to show the clinker movement.

with Stoody 21 rod was also perfected, so that both wear and leakage were ultimately eliminated.

The Monolith plant employs five relatively short gas-fired rotary kilns in its burning department. Three are 250 ft. long and two 285 ft. in length. Effective lengths are much greater, however, since four of the five kilns are preceded by 60-ft. rotary dryers above and ahead of the feed ends. The dryers are equipped with chains and a fifth is to be placed in service shortly to complete the installation. Burning zones in the kilns are lined with periclase-chrome brick, kiln and dryer speeds are synchronized, and the ferris-wheel feeders on the dryers are similarly controlled to regulate slurry input.

It was likewise in the interest of economy that the Holo-Flite cooling screws were considered and chosen for the clinker circuits. Pre-cooling of the clinker has always been achieved by a drag chain operating in a brick tunnel where heat is recuperated and returned to the kiln. Following the drag, a McCaslin overhead conveyor system transports the clinker, the buckets discharging to the storage area. In storage, the clinker (temperature 190 to 230 deg. F.) is shovel-loaded to a hopper, crushed down to minus 3/16 in. by a Symons cone crusher and a pair of Allis-Chalmers rolls, and split-fed to the two separate finish-grinding departments. One set of Holo-Flite screws was installed in each circuit ahead of the mills. Each unit consists of four parallel 16-in. screws, one of the troughs being 20 ft. long and the other 24 ft. Sectional inspection covers inclose the troughs at the top. Input temperature of the ambient water is about 60 deg., the water returning to a Marley cooling tower before re-use after circulating through the flights. About 650 g.p.m. is required, and in the process clinker temperature is brought down to about 95 deg. when fed to the mills.

The quadruple-screw units are highly efficient because the ratio of cooling surface of the flights to the volume of clinker is much more favorable than would be the case with single screws. It is interesting to observe that the volume of clinker handled, as well as the slow speed of rotation of the screws, has apparently had much to do with eliminating wear. It has long been common practice, with conventional screw-conveyors, to turn up a screw of the same diameter (16 in.) to about 40 r.p.m., with the feed of clinker so reduced that the trough is less than one-fourth full, on the theory that wear will be held to the minimum. The Holo-Flite troughs at Monolith operate entirely full, while the screws turn at speeds as low as 6.4 r.p.m. Wear has been negligible, so the installation seems to point the way to a new concept of screw-conveyor operating theory and practice. Monolith has applied for

The company-designed 2-compartment 8- by 42-ft. tube-mill recently installed in the finish-grinding department. It is friction-driven at three points by three 400-hp. motors.

patent protection on the equipment insofar as its use in cooling portland-cement clinker is concerned. License to fabricate, engineer, and market the equipment in its many applications has been assigned by the Christian interests to the Western Precipitation Corporation, Los Angeles.

In addition to the other advantages, mill output has increased about 5 percent since cool clinker became available. As has been stated, finish-grinding at Monolith is carried on in two separate mills. The original installation consists of a Unidan mill in closed circuit with F. L. Smidth air-separators. The second installation, which went into operation in June, 1951, consists of a company-designed 8- by 42-ft. 2-compartment semi-air-swept tube-mill, followed by two Multiclone collectors in series. Interestingly, this mill is powered by three 400-hp. motors driving flanged railroad-style car wheels which transmit the power entirely by friction against driven rings around the mill. A technical paper on the subject was delivered at the 1952 spring meeting of the Portland Cement Association in Los Angeles by Conn Humes, plant engineer at Monolith. Much of the credit for perfecting and adapting the cooling-conveyor installation belongs to Mr. Humes.

The Monolith Portland Cement Co. and a subsidiary, Monolith Portland Midwest Co., which operates a cement plant at Laramie, Wyo., have executive and operational offices in Los Angeles. Coy Burnett heads both companies. C. I. Smith is plant superintendent at Monolith, Calif., and F. J. Anderson is superintendent at the Laramie plant.

Labor Developments

(*From page* 121)

dition. Virtually no companies will be immune to welfare demands under the standards now set by the Board.

"5. Establishment of government regulation of a pattern of benefits of various types is undesirable, unnecessary, and contrary to our historical freedom of action.

"The setting up of a Wage Stabilization Board as the authority on what is good for employees in each of the various fields and as architect for future collective bargaining procedures is not an appropriate activity for any governmental agency in our society. On the contrary, it is a harmful encroachment upon free collective bargaining.

"6. Widespread and heedless development of these plans, particularly out of tax or government contract dollars, is bound to result in the ultimate curtailment or abandonment of many plans accompanied by disillusionment on the part of many employees, resulting in a demand for direct government-supplied security.

"7. A wave of health, welfare, and pension plans will foster a burden upon thousands of small bus-

(*Continued on page* 144)

from the PANTHEON in Rome . .

The Pantheon, one of the most famous Roman buildings built of concrete, was designed by Hadrian, and completed in 138 A.D. Its walls are 20 ft. thick, and the dome has ribs and arches of concrete. The secret of Roman success in making cement was in mixing slaked lime with a volcanic ash from Mt. Vesuvius, called pozzolana, which produced a cement capable of hardening under water.

CE

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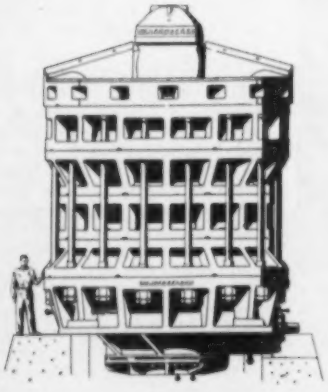
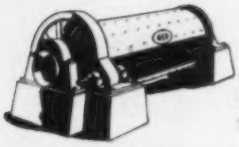
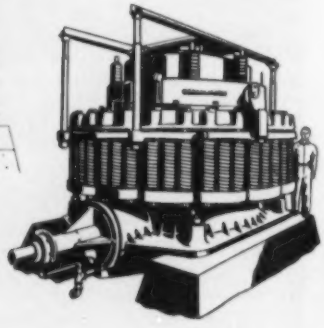
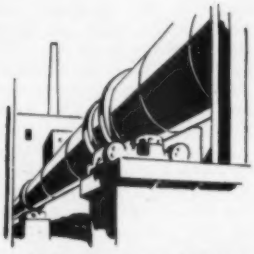


"SYMONS" GYRATORY and CONE CRUSHERS for Primary, Secondary and Fine Reduction Crushing.

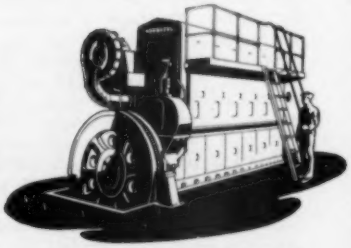


GRINDING MILLS for Wet or Dry Raw Grinding and for Preliminary and Finish Grinding.





DRYERS, KILNS and COOLERS for Pyro Processing Operations, Drying, Calcining, Burning and Cooling.



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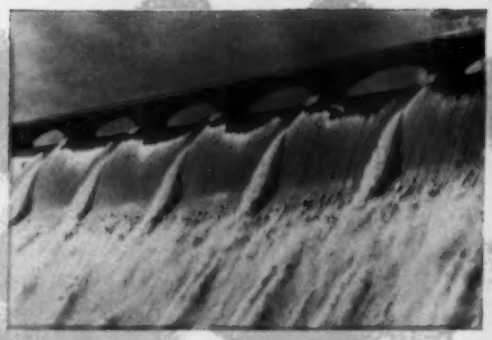
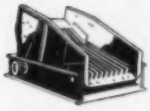
Almost 24 million tons of concrete . . . about the amount needed to build a four-lane highway from St. Louis to San Francisco . . . was used in the construction of Grand Coulee Dam on the Columbia River in the state of Washington. This is but one example of the tremendous part being played by cement in modern civilization.

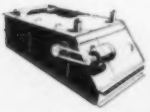


MENT

"Cornerstone of Civilization"



"SYMONS" VIBRATING BAR GRIZZLIES.



"SYMONS" HORIZONTAL and ROD DECK VIBRATING SCREENS.

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NORDBERG MACHINERY plays a vital part in today's production of PORTLAND CEMENT

JOSEPH ASPDIN, bricklayer of Leeds, England, who first made portland cement in 1824, probably never considered his experiments in the light of *putting a mountain through a sieve.* But he laid the foundation for the portland cement industry of today, which every year processes literally mountains of limestone, clay, cement rock and other raw materials into a powder so fine it will pass through a sieve capable of holding water.

Long known to the cement industry because of its ability to assure maximum, continuous production at low operating cost is the extensive line of dependable Nordberg machinery designed and built for this vital industry.

Nordberg cement machinery includes "*Symons*" gyratory crushers for primary crushing of raw materials; "*Symons*" Standard and Short Head crushers for preparation of finely, uniformly sized raw mill feed; "*Symons*" vibrating grizzlies and screens for scalping and sizing; wet and dry grinding ball, tube and compartment mills; rotary dryers, kilns and coolers.

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CANADA CEMENT COMPANY'S

NEW PLANT IN NEW BRUNSWICK

SERVES EASTERN CANADA

Features unusual raw blending and cement handling systems

By H. B. HOWE, P. ENG.
Chief Engineer
Canada Cement Company Limited

THE cement supply in eastern Canada, which has been critical for some years, will be supplemented by 800,000 bbl. per year from Canada Cement Company's new plant No. 2 at Havelock, N.B. Cement needs of the Maritime Provinces were supplied by Canada Cement Company's Plant No. 1, Montreal East, prior to this time. A part of the cement was transported by boat to storage plants at Chatham, N.B., and Halifax, N.S.; the balance by rail delivery. Due to high demand in the last few years, considerable imports of cement were required in the summer months, when construction was at its peak activity. This part of Canada will now be self-sufficient as regards cement. Moreover, by relieving the Montreal plant from the necessity of shipping eastward, the demands of the central provinces will be adequately met.

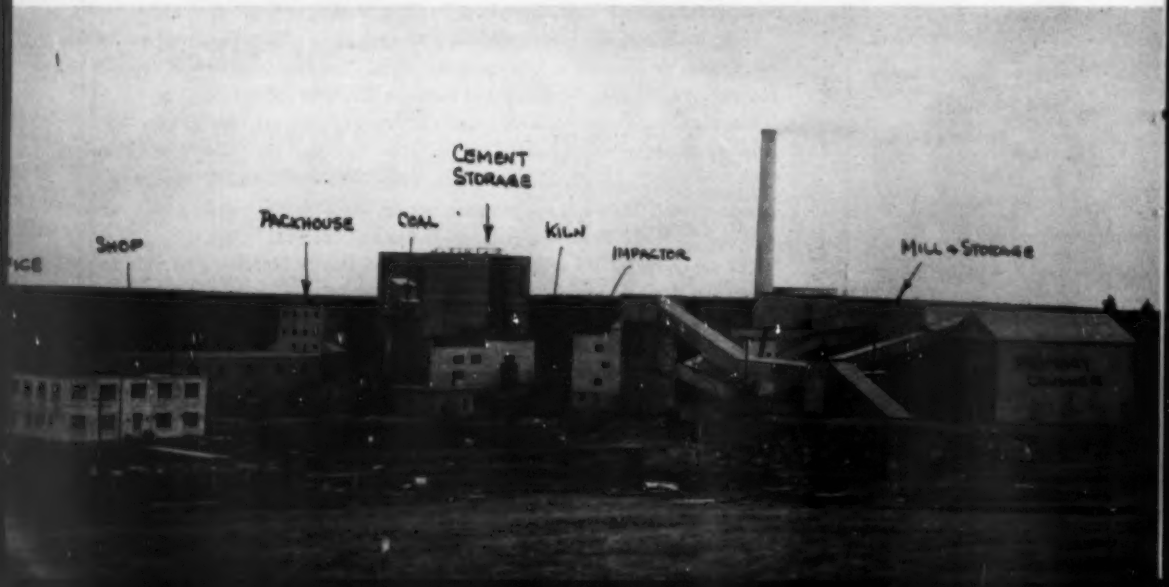
Studies of material sources and the economics of the project demonstrated its feasibility. A good railway network and highway system existed which, with relatively minor renovations near the plant site, were ready to serve. The logical site was at Havelock, New Brunswick, about 35 miles west of Moncton, where a good deposit of well-bedded limestone 40-50 ft. in depth is found. The approximate composition of the limestone is as follows:

Silica, SiO_2	4.7 percent
Combined oxides, R_2O_3	1.3
Lime, CaO	51.6
Magnesia, MgO	0.8
Ignition loss	41.3
Proportion of raw mix	84.0

About six miles distant, shale outcroppings were discovered, these having approximately the following composition:

Silica, SiO_2	60.7 percent
Alumina, Al_2O_3	15.5
Iron Oxide, Fe_2O_3	5.7
Lime, CaO	4.4
Magnesia, MgO	2.3
Ignition loss	6.7
Proportion of raw mix	16.0

A general view of the Canada Cement Company's facilities at Havelock, New Brunswick.

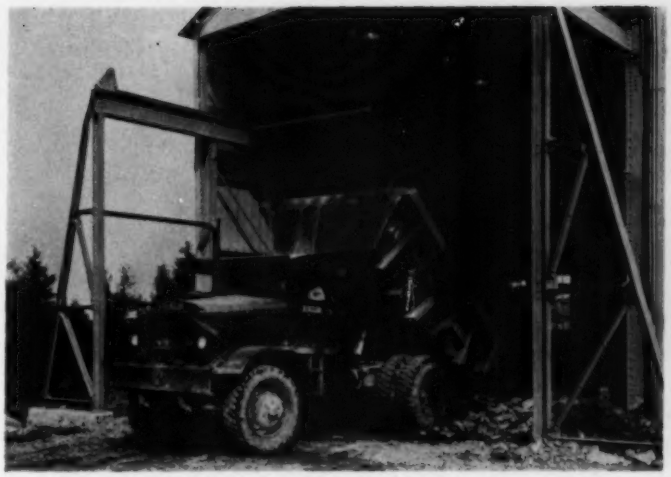


Within 10 miles of the plant site there is also an outcrop of gypsum, which was also developed to supply the operations. The location is therefore favorable in that all main constituents are within easy trucking distance.

Explorations had been done many years prior to the date of starting construction, but these were incomplete. Therefore in October, 1950, it was necessary to make a complete geological exploration of the limestone deposit to determine the best method of quarrying and the location of the plant. About November 1, 1950, construction on the plant itself started, with the construction of camp buildings and temporary offices.

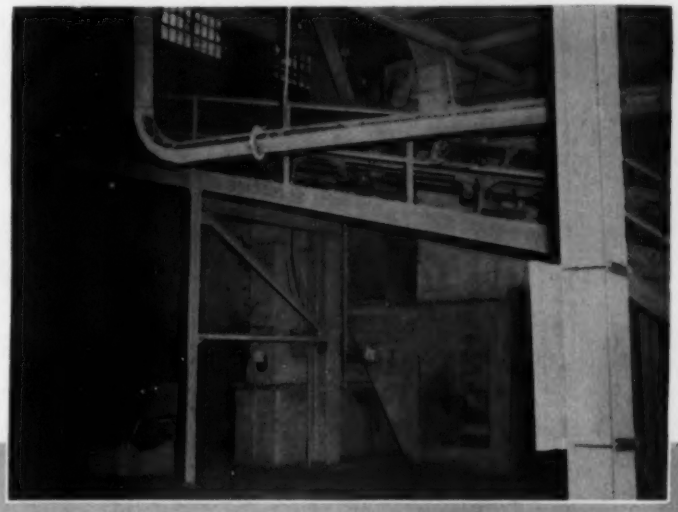
One of the basic decisions was that the plant had to be dry process, due to the fact that the only suitable water which could be procured was from wells within a radius of a mile or more, and this water was of indefinite supply. It was also most desirable to have a very efficient plant, due to the fact that the cost of power is quite high (a portion being produced by steam plants), and to the relatively high cost of coal delivered to the plant site.

Plans for transportation of materials into the plant and the method of shipping cement were undertaken rapidly. It was necessary to approach the Canadian National Railways and have them renovate about 15 miles of an obsolete railroad line, so that full carloads could be transported. It was also necessary to build about one and one-half miles of new railway from the vil-

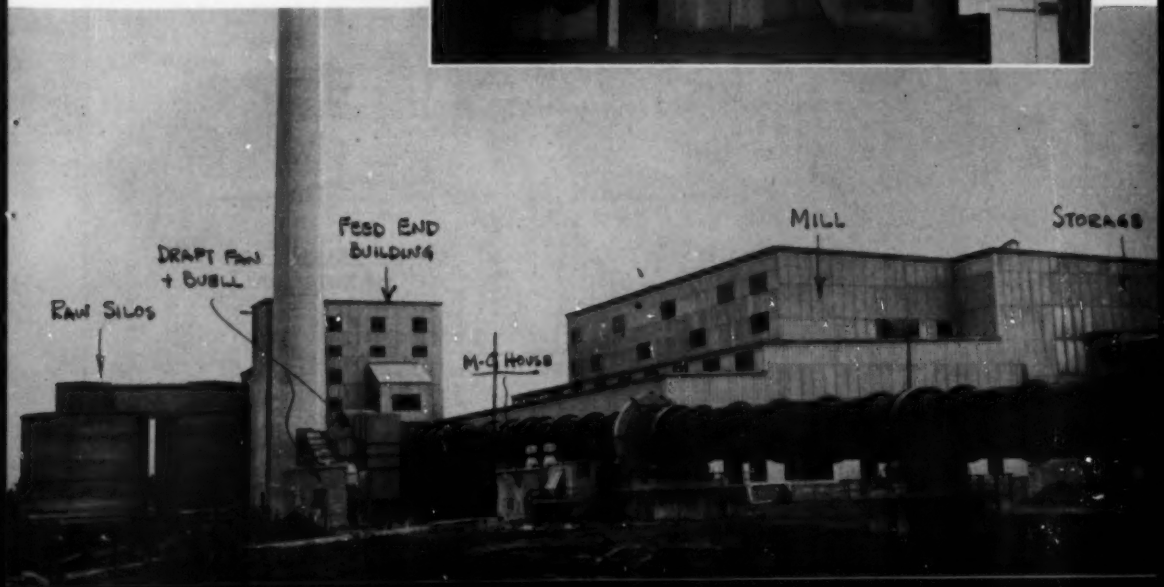


Above: An end-dump truck dumping at the primary crusher.

Below: The raw ball mill, with the feed conveyor (foreground) and the elevator (right).



In this closeup the kiln is shown, with the stack and dust collectors in the background.



The limestone quarry under development, showing a well drill and a shovel.

lage of Havelock into the actual plant site. All of this work was started immediately, so that heavy machinery and construction materials could be transported safely into the plant at the earliest possible date.

The general plan of the plant is shown in Fig. 1. Compactness and simplicity of layout are the keynotes. The flow sheet, Fig. 2, shows the technical circuit involved, from quarry to packed bags.

Quarrying and Crushing For the rock quarry, Bucyrus-Erie electric well drills, Model 26T, were chosen. Loading is done with a Bucyrus-Erie 85B electric shovel having a 3½-cu. yd. dipper, and the stone is transported to the crusher building in 15-ton Euclid trucks.

A gasoline-driven Bucyrus-Erie well drill, Model 22T serves in the shale quarry. The shovel is a Dominion No. 450 diesel, with 2½-cu. yd. dipper. Ten-ton International trucks haul the shale to a stockpile at the plant.

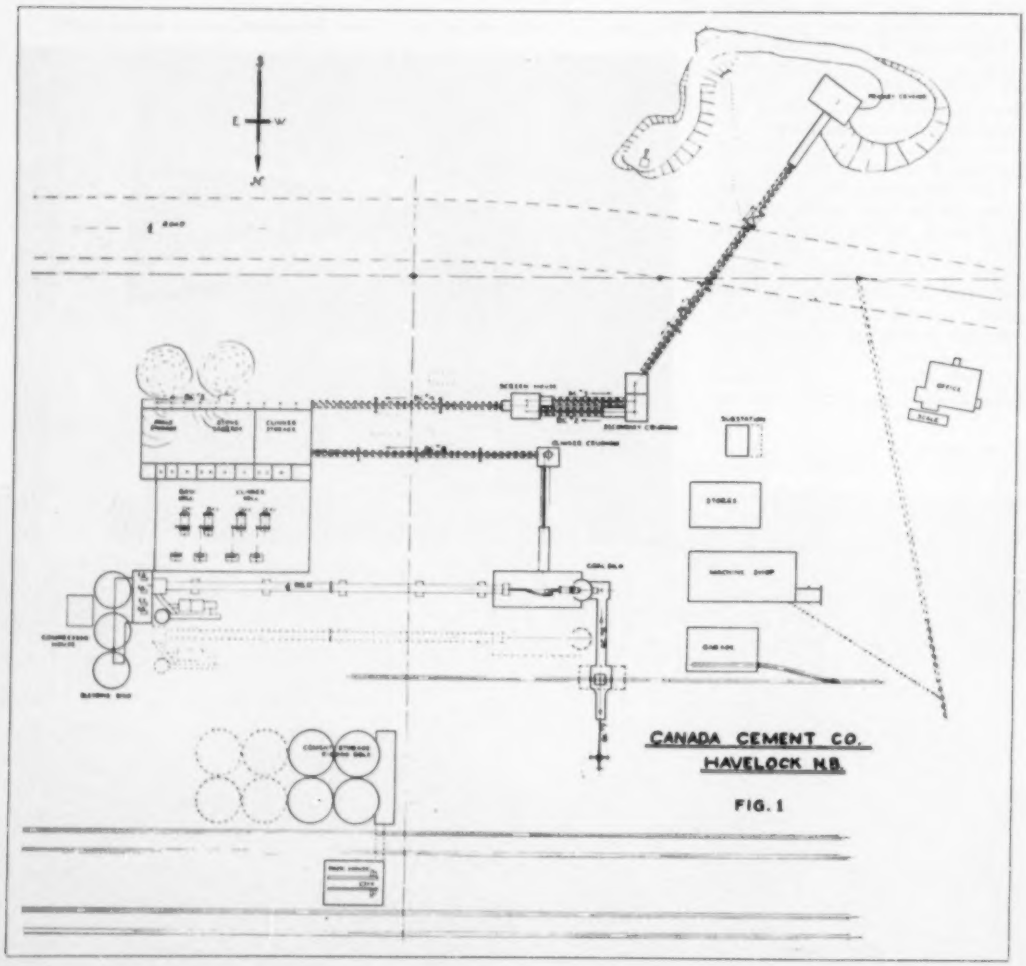
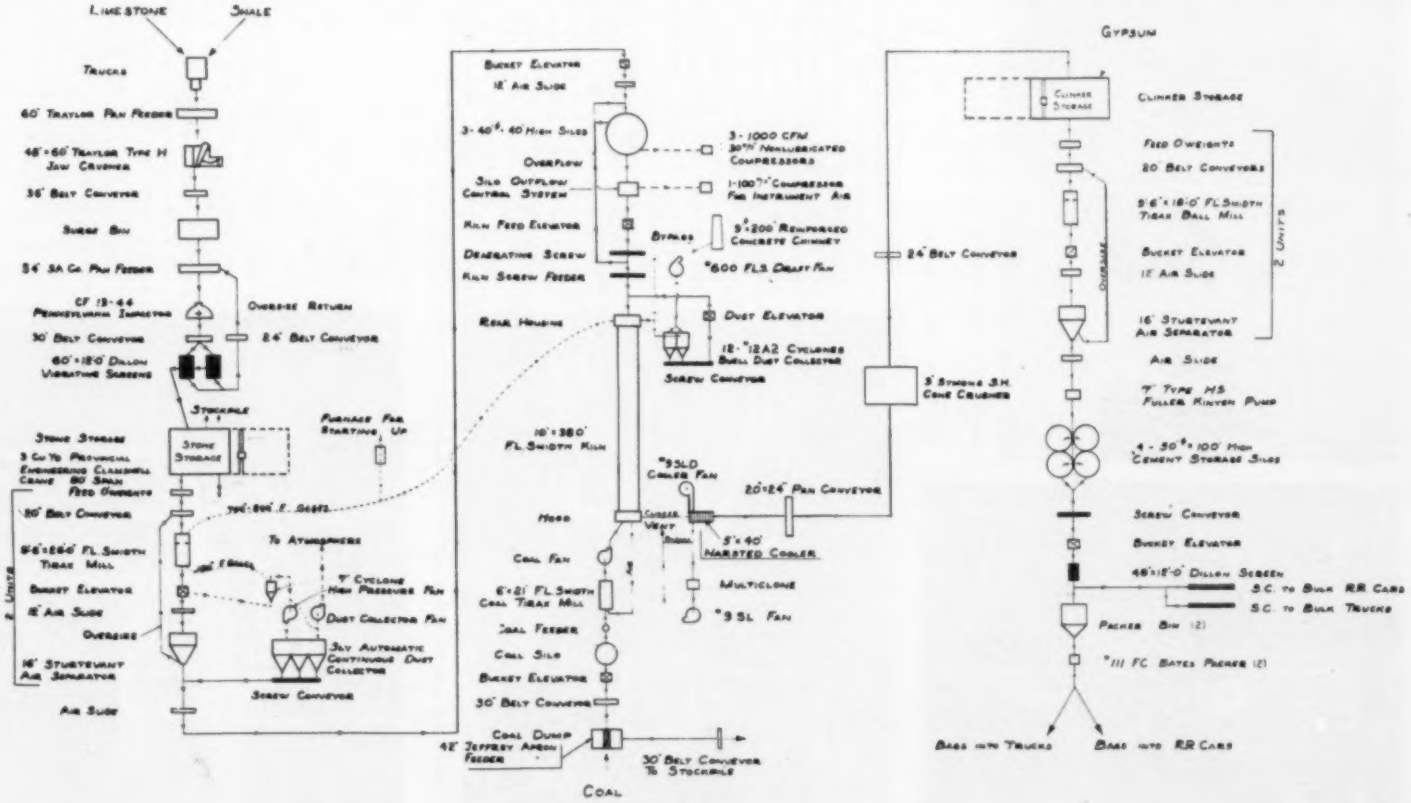


FIG. 1

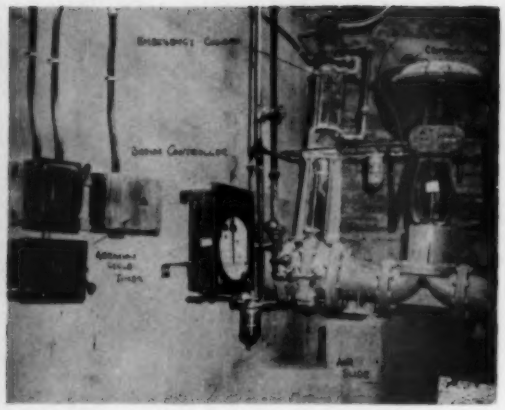


FLOW SHEET

CANADA CEMENT CO. LTD. PLANT NO 2

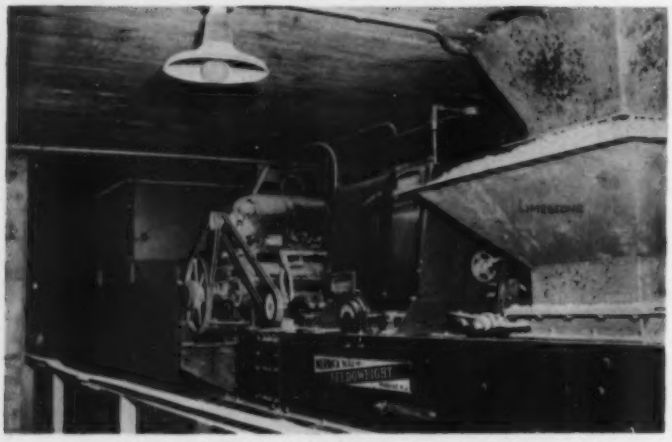
HAVELOCK N.B.

FIG 2



Above: Control equipment for the outflow from the raw silos.

Left: The raw mill control board.



The weighing feeders which proportion shale and stone to the raw mill.

The two 9½- by 18-ft. ball mills used for clinker grinding, with feed conveyors above.

The crushing system of the plant crushes all materials. Shale is stockpiled at the side of the quarry. Once or twice a week the required shale is crushed in several hours' continuous run. A 48- by 60-in. Traylor type H jaw crusher in the primary crusher building is driven by a 250-hp. motor and fed by a Traylor 60-in. cast-steel pan type apron feeder on which the Euclid trucks dump their loads.

The product of the crusher, which is normally set at 5-in. closed side setting, drops onto a 36-in. belt conveyor, by which it is conveyed across the road into the plant proper, discharging into the top of a secondary stone bin. The stone bin was required because the jaw crusher, which was chosen for mouth size, has greater capacity than the secondary unit.

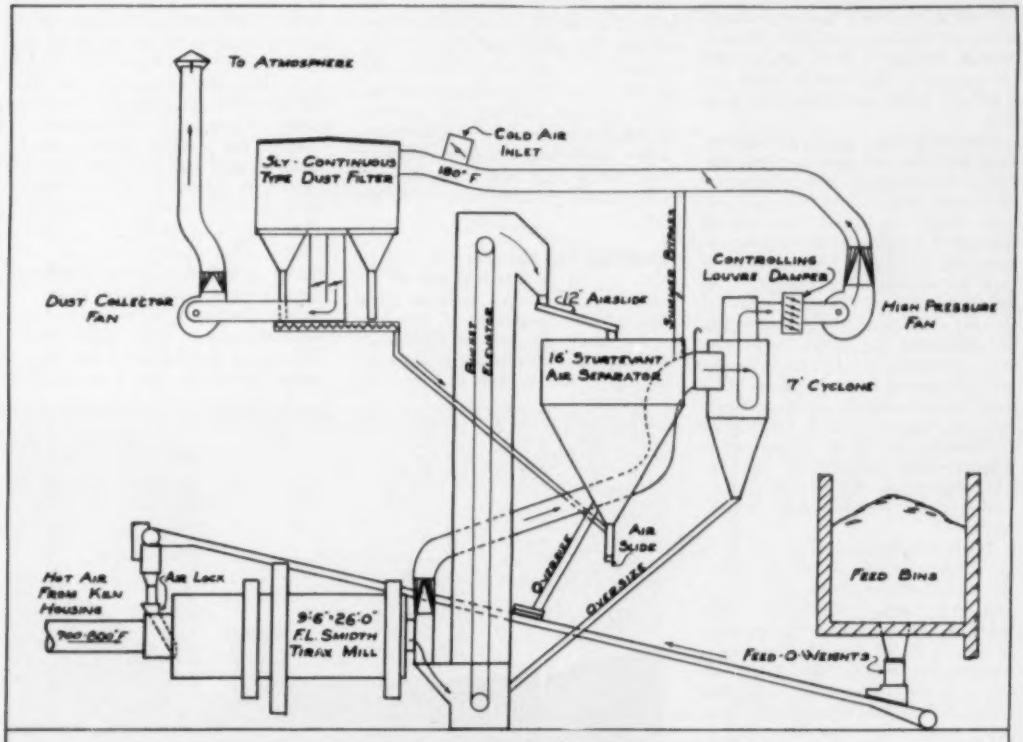
As a secondary crushing unit, a Pennsylvania Impactor, size CF 13-44, was chosen, which is fed by a Stephens Adamson 54-in. pan conveyor, drawing material from the surge bin. The Impactor is powered by a 350-hp., 900 r.p.m. wound-rotor motor, and discharges on to a 30-in. belt conveyor, which conveys the product to two 5- by 12-ft. Dillon screens. These are full floating screens suspended on rods, with ⅝-in. square space cloth, the oversize going back to the Impactor feeder for recrushing. The undersize goes direct to the stone storage by belt conveyor, but may be discharged to outside stockpile as well. The entire feed to the mills therefore, passes a ⅝-in. screen.

Storage Building The plant is constructed around a stone and clinker storage, one-half of which, divided off by a transverse retaining wall, contains piles of shale and limestone. The other side contains the clinker from the clinker crushing plant. The storage is covered and closed in as much as possible, in order to localize dust conditions. To serve the stone storage, one Provincial Engineering Company Ltd. clamshell crane with an 80-ft. span, and a 10-ton, 3-cu. yd. bucket, is used. This has a full electric control, with an air conditioned cab. The row of bins along the wall allows space for limestone, shale, silica, or iron cinders (if such are required) clinker, and gypsum, with an extra bin for limestone if masonry cement is to be manufactured at a later date.

Raw Material Grinding When considering the machinery to be installed in the raw department, full consideration was given to all types of dryers and grinding units. It was decided to utilize a ball mill in closed circuit with an air separator, as the grinding system, and to superimpose upon this a circuit of air or flue gases from the kiln of sufficient volume to drive off whatever moisture might occur in the stone and shale. The flow diagram for raw grinding units. Fig. No. 3, is descriptive. Estimates of the amount of moisture which might be encountered suggested that the system be designed for about 10 to 12 percent moisture. Actually, the mix, which is approximately 16 percent shale, and 84 percent limestone, contains about 2 percent moisture in the stone, and about 7 percent moisture in the shale. The circuit chosen has been able to handle this amount of moisture, producing a dry pulverized product of less than 0.5 percent moisture without any trouble.

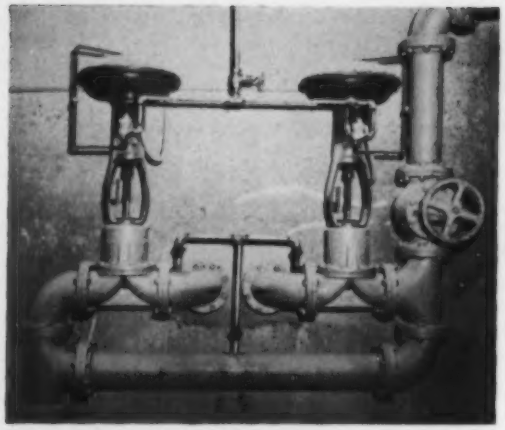
The two raw mills themselves are 9 ft. 6 in. in diameter by 26-ft. F. L. Smidth Tirax mills, the first 10 ft. of which is drying compartment, and the rest grinding chamber, carrying 67,000 lb. of grinding media. They are powered by 500-hp., 180 r.p.m. synchronous motors, of a split-winding type, giving excellent starting characteristics. The mills are supported on two slide rings with totally enclosed slide shoe bearings. An outside pressure lubricating system is required for starting up purposes, after which lubrication is self-maintained by dip method. In the drying compartment are grouted Ni-hard liners having lifters incorporated with them. Bolted forged liners are used in the grinding chamber.

The feed for each mill flows from the feed bins into Merrick tandem Feedoweights, one of which feeds the shale, and the other limestone. To change the proportion of shale to limestone, a variable-speed transmission, built into the drive of the shale Feedoweight is adjusted by the chemist. Both Feedoweights in the tandem set-up are driven by one 5 hp. General Electric ACA variable-speed motor, controlled by adjusting a remote speed control knob on the mill control panel. By means of this set-up there is no conflict between the miller and the chemist,



FLOW DIAGRAM FOR RAW GRINDING UNITS

FIG. 3



Equipment which controls air for agitation in the slurry silos.

as each operates his own independent controls. The product of the Feedoweights drops onto feed belts, which transfer it to the feed end of the raw mills. Here it must pass through an air lock into the mill, to prevent indraft of cold air at this point. The pulverized material from the mill drops into a bucket elevator, which elevates it to a Fuller-Huron Airslide feeding a 16-ft. Sturtevant air separator. The oversize from the separator drops back onto the feed belt.

Simultaneously, gases are drawn from the kiln dust chamber into the mill and through it, to dry the stone and shale. Since they will pick up some dust, the gases are sucked through a cyclone by the high-pressure fan, which in turn discharges into an automatic continuous type Sly dust collector. The gases out of the Sly dust collector pass through an additional fan, which overcomes the resistance of the filter alone, and exhausts to the atmosphere. The dust collected by the cyclone drops into the elevator and is carried up for classification in the air separator, whereas dust collected by the Sly filter drops into the Airslide and is conveyed to the blending department.

Inlet temperatures into the mill go as high as 700 deg. F., and outlet temperatures approach 170 to 180 deg., being controlled automatically to make sure the product is dry, and to provide safe inlet temperature to the Sly filters. All ducts, casings, separators, and dust collectors on this system are insulated with 2-in. Fiberglas.

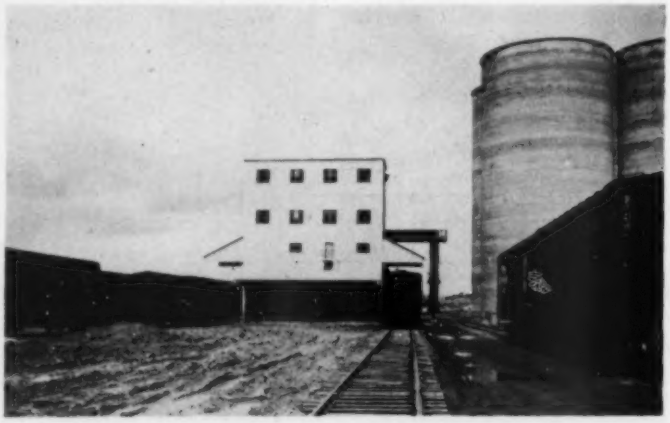
All the mills, feeders, conveyors, and accessory equipment are controlled at the mill control panel, located conveniently in the mill building. They are fully interlocked, and telltale lights on the panel show locations of trouble. Pressure gauges show the pressure at each point in the air system, and thermocouples or thermohms are provided for the electric controllers.

To enable the raw mill to be started up, hot gases are produced by a vertical furnace in which two oil burners are blasting to provide the heat. As soon as the heat is up at the back of the kiln, these oil burners are shut off and the dampers leading from the rear dust chamber are opened, so that the hot gases are drawn by the high-pressure fans through the mills and the air circuit of the system. The product from the air separators and dust filters is conveyed by a 10-in. Airslide into an elevator in the feed end building. This elevator elevates the material to the top of the feed end building, where it discharges into an Airslide distributing the raw material into any of three circular concrete blending silos.

Blending The blending silos are 40 ft. in diameter and 40 ft. high, with a monitor running along the top for protection of the Airslides. Each silo is vented through an automatic continuous Sly dust collector. The bottom of each silo is on a 4-degree slope and is covered as completely as possible with Fuller aeration blocks, which are piped together in groups so that one-quarter of the bottom of the silo can be aerated more intensively than the remainder. The draw-off point of the silos at the low side, is on the radial line between two of the aeration segments.

To provide air for aeration and blending, three 1,000 c.f.m. Canadian Ingersoll-Rand non-lubricated air compressors, driven by 125-hp. motors were installed. One compressor only is required to aerate and blend one silo. It had been impressed upon us that it was absolutely necessary to keep oil from passing by the air into the blocks. For this reason non-lubricated compressors were purchased which have carbon supporting blocks in the pistons, to provide a wearing surface. No oil whatsoever enters the compressing cylinder. These air compressors discharge directly into an air receiver, and thence into lines connected directly to the silos, segment by segment. Arrangements is made so that a small amount of air is permitted to seep into all segments of any silo bottom, to establish aeration prior to the application of blending air which under the control of electric timer, is applied to segments for 7½-minute intervals, making a complete circuit in any silo in 30 minutes.

After the material in any silo is blended, analyzed, and proven to be correct for kiln feed, it is withdrawn through an automatic feeding device (Fig. 4) into one of two elevators, which takes it to the kiln feeder platform. This automatic feeding device has three valves in series. The first is an automatic air-operated cut-off valve, which closes by manual pushbutton or because of failure of electric power or too high



The cement storage silos and packhouse.

a level of material in the elevator boot. The second valve is an automatically controlled Minneapolis Honeywell diaphragm valve, responding to a bubble-pipe in the boot of the elevator. The third is a manual mechanical valve in the Airslide from each silo.

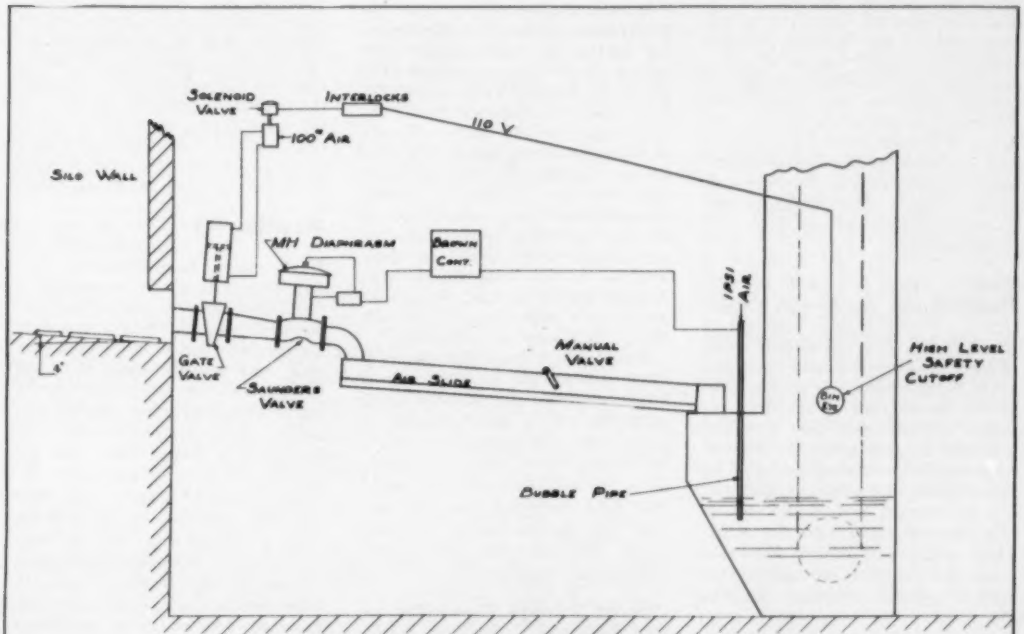
For continuous operating control the controlling valve is a Saunders diaphragm valve, actuated by a Minneapolis Honeywell diaphragm. Varying air pressure coming from a bubble-pipe in the elevator boot passes through a Brown controller which uses this impulse to control high-pressure air to the M-H diaphragm. To prevent flooding of the elevator boot, this diaphragm constantly adjusts the position of the Saunders valve. To prevent flooding of the elevator boot, all operational controls and indicators are centralized on a control panel in this department.

From the controlling valve, the feed material is conveyed by Airslide a few feet into an elevator, and is thence elevated to the top of the feed end building. Here it discharges into a series of de-aerating screws which finally discharge into the choke screw of the feed screw itself. The elevators bring up an excessive amount of feed material, the overflow of which is conveyed by a 12-in. Airslide back to the silo from which it was drawn. The kiln feed screw is driven by a 7½-hp. motor, which is electrically connected to the Ward-Leonard system of the kiln drive. A Reeves variable-speed transmission in the drive of the kiln feed screw permits a change in feed rate of the kiln. The same thing can be done by adjusting the speed of the motor by rheostat for any given kiln motor speed.

At the time the plant was designed we knew that the materials which would be used for the manufacture of cement would be entirely new to us; so we took every precaution to make sure that raw mix could be corrected if it were not suitable when it got into one of the blending silos. For that reason, three silos (instead of one) were provided, and also an additional elevator in the feed end building. This arrangement would serve primarily as a stand-by to the kiln feed elevator, and also as a means of transferring material from one silo to another for correction purposes. For this reason an Airslide is found on top of the blending silos, to be used for transfer of material from one silo to another, if necessary. Experience has shown that kiln feed variation is in the order of plus or minus .15 percent on the holding point expressed in percentage of total carbonates. Regular production samples are taken continuously.

Burning and Cooling The F. L. Smidth welded kiln, 10 ft. in diameter by 380 ft. long, and of uniform diameter throughout its length, is mounted on a slope of 7/16 in. per ft. It is supported on five full-floating tires, the support rollers being of a sleeve-bearing design. Kiln lining is second-quality and first-quality refractory in the upper sections, while the burning zone is lined with Canadian Refractories Ltd., Magnecon brick, 6 in thick. The kiln was designed for 2,000 bbl. per day production at high economy, anticipating a maximum of 2,500 bbl. per day to be possible. It is evident these figures can be met.

The steel dust chamber at the back of the kiln, supported on a structural steel frame, is fully lined with 9-in. firebrick. As mentioned above, an insulated duct is carried from one side of the dust chamber to the mill building to provide heat for drying raw materials. The remaining gases pass from the opposite side of the dust chamber, where



SILO OUTFLOW CONTROL SCHEMATIC
FIG. 4.

blending air reduces the temperature to about 700 deg. F. before entry into the Buell dust collector, which consists of 12 cyclones. From the outlet side of the Buell the gas is drawn by a No. 600 F. L. Smidth induced-draft fan, discharging to the chimney. Arrangements were made to by-pass the Buell dust collector if trouble arose in it or in the induced-draft fan. The 9- by 200-ft. Custodis reinforced concrete chimney has an independent brick lining. The dust collected by the rear dust chamber and the Buell dust collector is conveyed by a 12-in. screw conveyor to a dust elevator, which discharges the collected dust into the feed screw just before the kiln feed pipe.

The kiln is driven by a 125-hp. motor, which is driven and controlled by a Ward-Leonard system. A triple reduction gear box is direct-coupled between the motor and the master pinion of the kiln. With the exception of a small light metal housing over the kiln motor, magnetic brake, alternator, and auxiliary gasoline engine, the drive is entirely out-of-doors. A small building houses the kiln m.g. set and other electrical equipment.

The hood of the kiln is the conventional retractable hood on wheels, with the connection on the top for obtaining hot air for the coal pulverizer. The hood sits directly over the inlet neck of the Narsted primary cooler. This cooler has an effective grate 5 ft. wide by 40 ft. long, which quickly quenches the clinker and discharges it well below 200 deg. F. A pan conveyor receives the clinker and conveys it to the clinker crushing building. The pan conveyor was chosen because space limitation required one having a steep-angle conveying ability.

Coal Handling Coal is received by rail-way car, through a track hopper with an apron feeder below. The apron feeder discharges in one direction onto a conveyor, which carries it to the base of an elevator having a casing integral with the coal silo. This silo will hold approximately a two days' coal supply for kiln operation. The apron feeder of the track hopper can also be reversed to discharge onto a belt projecting up into the yard, which will permit coal to be stock-piled for winter operations or against possible shipping failure, etc.

The coal silo was built by the moving form method, and a suspended reinforced concrete cone was then built inside. Attached to the bottom of the cone is a table-type feeder, driven by a variable-speed motor, controllable from the kiln control panel. The coal mill is an air-swept F. L. Smidth Tirax coal mill, 6 ft. in diameter by 21 ft. long, carrying 16,000 lb. of grinding media, and driven by a 125-hp. motor. The coal fan is mounted on the burner's platform, drawing hot air through the coal mill, blasting directly to the burner pipe. An air-cooled burner pipe was found necessary for flame control, utilizing a small quantity of air from the primary cooler fan for entry in the outer sleeve. The coal is of approximately the following composition:

Moisture, as received	4.0 percent
Proximate analysis (air dry basis)	
H_2O	0.8
V.M.	36.0
F.C.	53.8
Ash	8.8
S	2.4
B.t.u./lb.	13,500

Clinker Grinding The clinker crusher is a 3-ft. Symons Short Head cone crusher driven by a 60 hp. motor. It discharges directly on to a 24-in. belt conveyor, which carries the crushed clinker to storage. The clinker mill feed bins are serviced by the same crane as those used for the raw department.

The clinker mill has the same feed belt arrangement as the raw department, gypsum and clinker being fed by the Feedoweights onto the feed belts. The two clinker mills are F. L. Smidth Tirax ball mills, 9 ft. 6 in. in diameter by 18 ft. long, with 86,000 lb. of charge, of the same fundamental design as the raw mills, with the exception that they do not have a drying compartment. They are driven by 600 hp., 180 r.p.m. synchronous motors of the same design as those used on the raw mill. An elevator, Airslide system is used, as in the raw mill, to close-circuit them with 16 ft. Sturtevant air separators.

The product from the air separators is conveyed by Airslide to a 7-in. Type HS Fuller-Kinyon pump, equipped with a C-120 Fuller air compressor. The pump is powered by a 60-hp. motor, and the compressor is powered by a 75-hp. motor. The 6-in. transport line pipe conveys the cement under the kiln, across the yard, and up into the four cement storage silos.

Cement Storage and Packing These silos are 50 ft. in diameter by 120 ft. high, each holding 50,000 barrels (Canadian); the interstice are also filled. The lower 20 ft. contains a column-and-slab structure, to form conveyor space below the body of the cement. Four 16-in. screw conveyors, one under each silo, tap off and draw the cement to a collecting 18-in. screw conveyor, which passes underneath the packing tracks in a tunnel to the packhouse.

Two machines were installed in the packhouse to permit bag shipment of 4,000 bbl. per 8-hour day. In the packhouse proper an elevator takes the cement from the collecting 18-in. screw conveyor and elevates it to the top floor where it passes over a Dillon vibrating screen which removes foreign material from it. The screened cement is conveyed by screw conveyor to packer bins, or to the outside of the packhouse at the same level for loading bulk railway cars. The two packing machines are No. 111 F. C. St. Regis packers, driven by 20-hp., 1,200 r.p.m. motors. Provision was made for the installation of a parallel conveying system from the stock-house, a second elevator with a screen, and a third packing machine, for handling two types of cement.

From the packing machines the bags drop onto a transfer conveyor and discharge to hand trucks for railroad car loading. One point is provided at each side of the packhouse for this work. For loading bagged cement into trucks shuttle conveyors will be provided at the two packing machines. A screw conveyor loads bulk trucks through the packer bin towards the front of the packhouse, where bulk trucks can back in. Thus facility has been provided for the four types of shipments which may be encountered.

Miscellaneous Due to the fact that Havelock, N. B., is remote from industrial centers, it was necessary to provide a good machine shop and service center for the plant. The machine shop was constructed in the very beginning, and machine tools, including two medium-size lathes, a shaper, a radial drill, and other smaller machine tools, were provided. A Bucyrus-Erie bit dresser was installed to sharpen bits from the shale and rock quarries. An area was also provided for a carpenter shop, a welding shop, and an automotive shop. It became convenient, because of the depth to rock, to utilize the basement for a storeroom. Foremen's offices are on mezzanine floors on each side of the central bay of the machine shop.

The electrical system chosen was

(*Continued on page* 145)

Notes on Burning of Cements In Wet-Process Rotary Kilns

By JOHN RUTLE,
Chief Chemist
Christiania Portland Cementfabrik
Oslo, Norway

THE rotary kiln has been employed in the cement industry for more than half a century. It has gradually displaced other furnaces, such as shaft kilns, until it has now become nearly the only furnace used for burning cement, either singly or in conjunction with other burning devices, as for example traveling grates. The replacement of the shaft kiln by the rotary kiln did not mean any advantage insofar as fuel economy is concerned. On the contrary, the first rotary kilns had a considerably higher fuel consumption per unit output than the shaft kilns. While the rotary kiln, in spite of this disadvantage, has gained more and more ground, the reason for this is that, unlike the other kilns, it is an open furnace, which allows the human eye to watch and adjust the process. This is a great advantage, which insures a more uniform product. In addition to this fact, the rotary kiln saves man-hours and can be adapted to the dry, the semi-dry, and the wet processes.

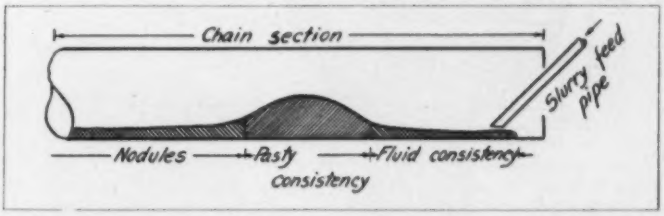


Figure 1. Variations of material load in the chain section of the wet-process kiln.

The first rotary kilns were relatively small units, consisting of a simple pipe without any internal devices for facilitating heat transfer. Their disadvantages, namely the high fuel consumption and high concentration of dust in the stack gases, have been largely overcome by increasing the length of the kiln and the internal heat transmission area. This progress however, has been achieved by sacrificing the kiln's original simplicity. While the old kilns could be operated satisfactorily by nearly anyone with some training, the operation of the modern kilns require a fully experienced and intelligent operator, as well as an experienced supervisor who also has sufficient chemical knowledge to achieve a fundamental understanding of the process.

The following comments are based on years of observation of the burning process in different wet-process rotary kilns, such as Unax kilns and the Folax kiln with grate air-quenching cooler, both types of the F. L. Smidth design. Some data for two of the kilns are as follows:

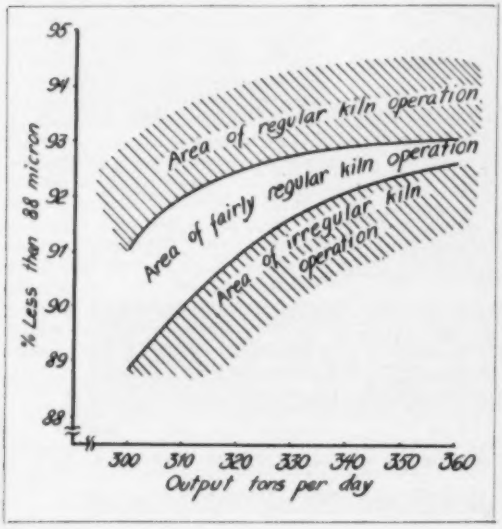
Unax kiln: 11 by 360 ft., with enlarged burning and calcining zone; planetary multi-tube coolers; single-chain system in the dewatering zone; exit gas temperature, 240 deg. C. (460 deg. F.); instruments for CO_2, $CO + H_2$, exit gas temperature, and static pressure at the inlet end of the kiln; capacity, 350 metric tons per day.

Folax cooler kiln: 11 by 370 ft., with enlarged dewatering zone; air-quenching grate cooler; preheater installed in the upper part of the dewatering section; double-chain system; quadrant in the lower part of the dewatering zone; exit gas temperature, 150 deg. C. (300 deg. F.); control instrument panel with instruments for practically every measurable factor in the kiln operation; capacity, 370 metric tons per day.

In order to catch up with the increasing demand for cement in the postwar time, it has been necessary to force the kilns as much as possible. The modern rotary kiln, with its high fuel economy, can as a rule be forced to an upper limit, depending on different factors, without any trouble. If this limit is exceeded, the load begins to fluctuate, and trouble is likely to arise. According to the writer's opinion, this trouble has its origin in the cool section of the kiln. When this slurry is fed into the kiln, it is in a fluid state and therefore moves rather quickly down the kiln, until it has lost enough water to assume a pasty, sticky consistency. It will then be retarded in its movement and will accumulate to some extent in the kiln, as indicated in the diagram above (Figure 1).

It is easy to locate this zone, because the kiln shell is rather cool at this point, due to the accumulation of materials inside. As the materials lose more water, the paste is transformed into nodules which, unlike the paste, move rather quickly down the kiln. The nodules are formed in the lower part of the pasty, sticky consistency zone. This

Figure 2. How fineness of raw meal influences kiln operation.



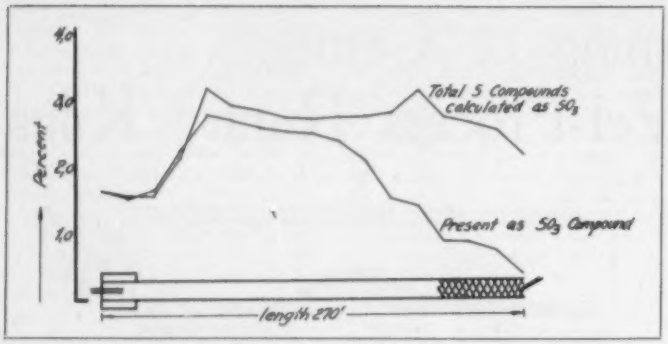


Figure 3. Content of sulphuric compounds in material samples taken at different points in the kiln.

zone can therefore be referred to as the nodulizing zone. The rate at which the nodules are formed depends on the heat transmission in this zone, which again is affected by many factors, such as the temperature, velocity, and chemical composition of the gases. It is of very great importance to keep all these factors constant; otherwise the rate by which the nodules are formed will vary, and the result will be a fluctuating load in the burning zone. It is not possible, however, to keep all these factors entirely constant. Small variations will always occur, and there will always be a more or less pronounced fluctuating of the load in the burning zone. These fluctuations are not so harmful, as long as the output of the kiln is rather moderate.

However, if the kiln output is raised to approach its capacity limit, it very often happens that the burner is forced to slow down the speed of the kiln in order to get a complete clinkering of the materials. When the speed of the kiln is slowed down, marked changes of the heat transmission in the different zones of the kiln result. The gas temperature in the nodulizing zone rises, and the formation of nodules per kiln revolution will increase considerably. When the kiln speed, generally after a short lapse of time, is rendered normal again, a "wave" of materials leaves the nodulizing zone and moves down the kiln. When it reaches the burning zone, the burner has to slow down the kiln speed again, and the same process is repeated. The material "waves" in the burning zone follow each other at constant intervals, which are equal to the time necessary for the materials to move from the nodulizing zone to the burning zone.

When the kiln speed is rendered normal again after a period of slow speed, the heat transmission in the nodulizing zone decreases, and consequently the supply of materials to the zone and release of materials from the zone are out of balance. The accumulation of materials in the zone increases, and the result will be that the material "waves" are followed by a period of exceptionally low load.

In order to escape these difficulties, certain measures should be taken, such as reduction of the slurry feed to the kiln and addition of extra water to the slurry in the correct amount and at the right time to compensate for the increased heat transmission in the nodulizing zone, which occurs when the kiln speed is slowed down.

The nodulizing zone always moves very slowly upwards or downwards in the kiln between an upper and a lower point. The distance between these two points depends on the variation of the heat transmission. It is of great importance that the heat transmission area between the two points be quite uniform. If for example, there should be a change from a double- to a single-chain system, trouble will result.

In periods of irregular operation as described, there will be very much dust in the materials. When the kiln speed is slowed down, the materials will dry out too much in the chain section, and the nodules will be ground to some extent by the chains. The material "waves" will therefore be excessively dust-containing. When the dust reaches the burning zone, it flows through the zone very quickly and into the cooler (the principle for this dust transport through the burning zone is the same as for the Airslide).

The amount of dust in the kiln depends on many factors, such as the nodulizing property of the raw materials. Other factors being constant, the nodulizing property of the materials is improved with increasing surface area.

As to the question of the fineness to which the materials should be ground, the opinions seem to be rather conflicting. Some manufacturers claim that the raw materials should be ground to 96 percent less than 88 micron (Sieve No. 170), while others claim that 75 percent less than 88 micron is sufficient.

While it is well known that the clinkering process is facilitated when the raw meal is ground to a high surface area, little attention has been paid to the relationship between the surface area of the raw meal and its nodulizing properties, although this point in many cases may be the most important one.

The diagram (Figure 2) shows the relationship between regularity of kiln operation, kiln output, and fineness of raw meal. The conclusions which can be deduced from the diagram are not, of course, of a general nature, and caution should be exercised in employing the presented data for other types of kilns and raw meals. It should be emphasized that the diagram refers to a definite raw meal, as well as to a definite kiln. Difficulties resulting from fluctuating kiln loads as previously described, are referred to as irregular kiln operation in the diagram. The writer is inclined to believe that the beneficial influence on the kiln output and regularity of operation resulting when the fineness increases, is chiefly attributed to the improvement in the raw meal nodulizing property, which follows when the fineness increases. This is, however, an hypothesis which has not hitherto been proved. It is quite evident that the dust content in the kiln charge increases markedly when the raw meal is too coarsely ground. Dust in the kiln charge can arise through grinding of the nodules in the chain section and/or pulverizing of the nodules

Figure 4. Influence of kiln size and exit gas temperature on SO_3 content of clinker.

	Size	Exit gas temperature	Average SO_3 content in clinker
Kiln 1	8' x 180'	500°C (930°F)	0.83 %
Kiln 2	11' x 360'	240°C (460°F)	1.23 %

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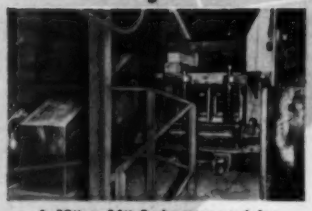

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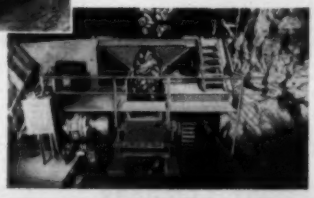

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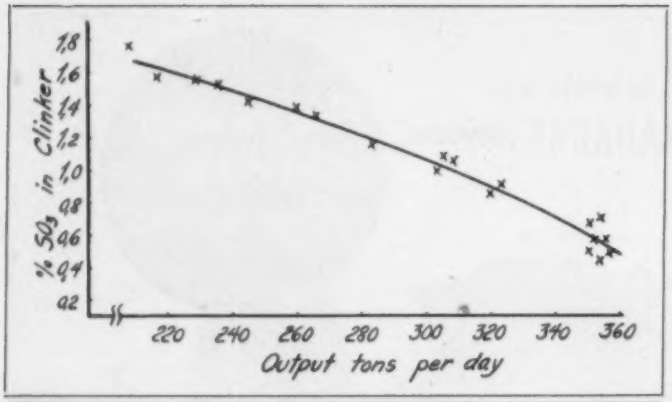

Figure 5. Influence of kiln output on SO_3 content of clinker.

when the CO_2 is expelled in the calcining zone. The extent to which dust occurs depends largely on the cohesive strength of the nodules. Even a small amount of very coarse particles in the raw meal may be very detrimental, as such particles may pass the calcining zone without being completely calcined. In the clinkering zone the CO_2 is expelled explosively and the nodules are therefore pulverized.

Difficulties experienced with formation of rings in the rotary kiln are very common. This problem therefore, has, been the object of numerous technical articles, especially in the German technical literature. Some recommendations, such as the use of coal with lower ash content, have been given. However, this very often means higher production costs, and it is therefore no satisfactory remedy.

The difficulties can probably be overcome in many cases by correct operation of the kiln. However, no general rules can be given for such operation, because conditions vary too much from plant to plant. It is rather surprising that little attention has been paid to dust in the kiln charge, when dealing with the ring problem. In the author's opinion, this is one of the most common causes for ring formation. Some of the factors which have a direct bearing upon the amount of dust in the charge have been previously described.

The dust which is unloaded into the cooler will to some degree be returned to the kiln by the secondary air. The dust partially mixes with the coal ash. These two components form eutectic compounds, containing a comparatively high percentage of liquid.

The dust-ash particles are carried upwards in the kiln by the fuel gases. When these particles (which are partially in a liquid state) settle, they tend to stick to the relatively cool lining, or to its coating. They may act as a glue for binding the kiln charge to the lining/coating and thus cause ring formation. Rings which are attributed to dust in the kiln charge frequently build up on the boundry between the clinkering and cooling zones of the kiln, as well as in the calcining zone and even in the cool region of the kiln. Ring formation due to dust can very often be avoided through correct operation of the kiln. Reduction of the burner pipe diameter, *i.e.*, a higher velocity of primary air, often eliminates ring

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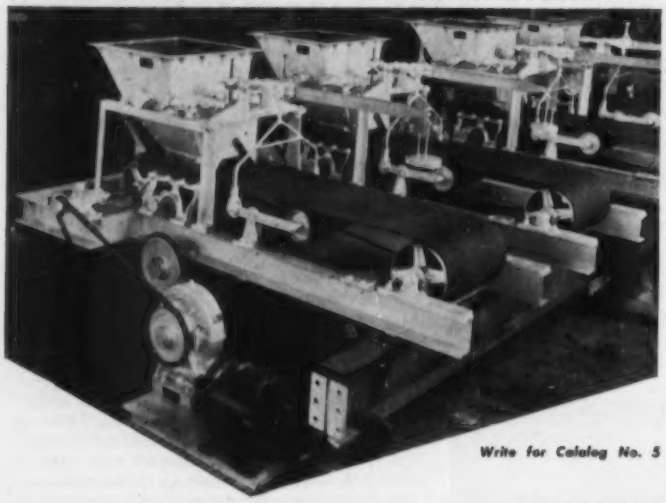

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formation between the clinkering and cooling zones. Ring difficulties in the calcining and cooling sections of the kiln can be eliminated in some cases by the reduction of excess air or regulation of the relative amount of primary and secondary air. Adjustment of the position of the burner pipe may also prove effective. The main thing however, according to the writer's experience, is to adjust the process on minimum dust in the kiln charge.

Some rings are referred to as alkali or sulphate rings due to their high content of these components. A great portion of the alkali and sulphate compounds which enter the clinkering zone volatilize in this zone and condense to some degree as alkali sulphates in the cool region of the kiln, where they may cause formation of rings. If for example, sea water is utilized for the slurry, alkali rings are likely to be formed rather quickly. Alkali sulphates settle to some extent in the dust collector. The author knows of one manufacturer who is lucky enough to get nearly pure potassium sulphate in his dust collector.

It is well known that the operation of the kiln has a bearing upon clinker quality. This is not the case merely because the kiln operation influences the quantity and nature of the major clinker compounds, but also because it affects the quantity of minute compounds, such as alkalis and sulphates. Little attention was paid to the alkali compounds until the discovery of cement aggregate reactions, referred to as alkali reactions. No difficulties have been experienced in Europe with alkali reactions. Therefore, relatively little observance has been paid to the alkali content of cement in this part of the world.

High sulphate content in the clinker, on the other hand has been a problem in some European plants. Unlike the case for sulphate, the author has made relatively few direct observations as to the factors which determine the alkali content of clinker. In all probability largely the same factors in kiln operation affect sulphate and alkali content of clinker. Where both components are present, they are chiefly combined as alkali sulphates. This was established by the author many years ago for a certain clinker, and has been confirmed by others for clinker of other origin.* Alkali sulphates are proved not to interact

*Portland Cement Association Fellowship Paper No. 60: Effect of SO_3 on the Alkali Compounds of Portland Cement Clinker.

(*Continued on page* 147)

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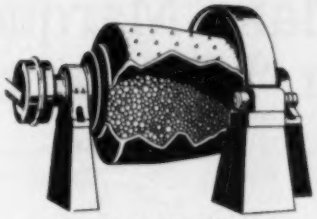

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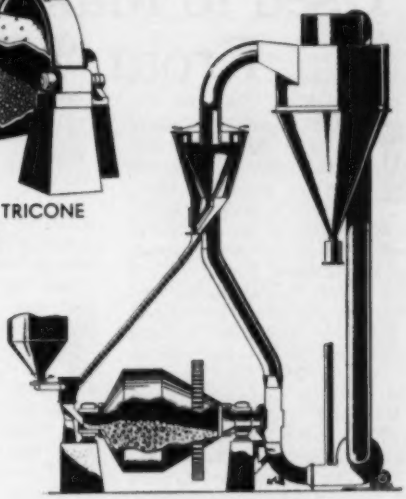

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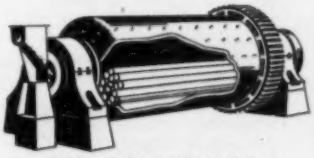

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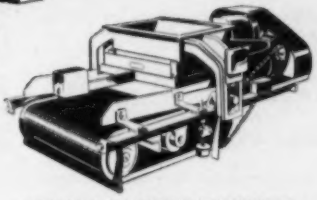

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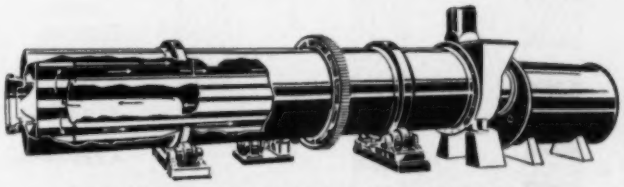

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4-Component Graphic Control System Used to Make Marquette Cement From "Mississippi Mud"

By SAM WEBB
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Marquette Cement Mfg. Co.
Brandon, Miss.

WHEN experienced cement men visit Marquette Cement's new wet process plant at Brandon, Miss., they are sometimes astonished at first sight of the quarry and amazed to learn that the materials make an excellent cement "mix". This is because they are accustomed to limestone and other conventional raw materials, while the Brandon material resembles nothing quite so much as just "Mississippi mud".

The quarry is an outcropping of the Vicksburg Group, which contains the Glendon limestones, interbedded with soft marl, hard marl, and clay. The predominant material is the marl, which ranges in color from blue-gray to yellow-brown, and in hardness from a plastic state to a chalky consistency. Typical test hole logs are described in Figure 1.

The methods and equipment used for quarrying and crushing are designed especially for this conglomerate. (For details see the complete description of this operation elsewhere in this issue.)

Washables and Non-Washables After primary crushing the conglomerate is separated into two classes of materials in a wash mill. The harder materials are washed, screened to separate them from marl slip, spray-rinsed, and crushed to minus one-half inch for storage as crushed stone (non-washable). The washings, called marl slip, contain all the soft marl, as well as small fragments of the harder materials broken off in primary crushing and washing. The marls contain a high percentage of naturally colloidal particles which are easily disintegrated by agitation in water. The coarser marl slip particles are separated from the fines in a classifier and ground to minus 16-mesh to prevent settling in the marl slip storage tanks.

When separated in this manner, there is considerable variation in the proporation of washables to non-washables, because of variations in the quarry deposit (see Figure 1). On the average, however, 80 percent by weight of the "as quarried" material emerges from the wash mill as marl slip, and only about 20 percent as crushed stone.

For storage of marl and clay slips, four tanks were provided, each 55 ft. in diameter by 24 ft. deep. No provisions are contemplated for wasting any of the marl since it is possible to use the marl and stone in essentially their natural proportions in the raw mix.

Typical analyses of marl slip and limestone are given in Table 1.

Clay and Sand Several usable types of clay are found in abundance in the deposit. In dry weather, the selected clay is exposed, scarified, sun-dried, and stored as dry clay. If the dry clay supply becomes exhausted in wet weather, moist clay is harvested and made into clay slip, using the same process as for marl slip.

Clean, fine river sand is available at a nearby sand-pit, dry and ready for use. Included in Table 1 are typical clay and sand analyses.

Four-Component Mix Here, then, is the problem: Four materials—marl slip, crushed stone, clay, and sand—must be combined semi-continuously in proportions which will satisfy certain conditions:

1. The kiln feed must be uniform in composition and burnability, producing high-quality clinker for the various types of cement to be produced.
2. Moisture content must be controlled, and held to the lowest value consistent with good blending and pumpability.
3. The natural ratio of stone to marl must be preserved in the mix, for maximum utilization of the quarried materials.
4. Cumbersome, technical calculations should be avoided.

As for the burnability of the mix, it was known from preliminary full scale experiments at the Cowan, Tenn., plant, using Brandon materials, that the marl tends to be excessively easy burning. This is due probably to its natural fineness and low silica ratio. To con-

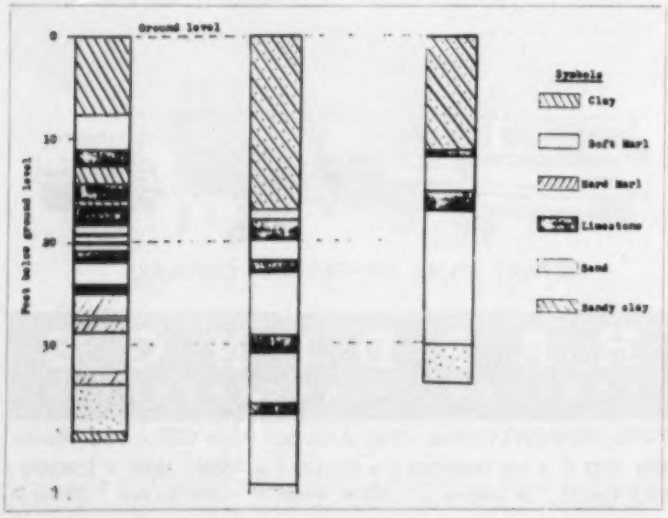


Figure 1—Typical test hole logs from the Brandon quarry, showing the variations in type and depth of strata encountered at different locations.

Table 1—Typical Raw Material Analyses

		Ignition Loss	SiO_2	Al_2O_3	Fe_2O_3	CaO
Washed limestone		41.82	1.68	3.41	1.47	50.74
Marl slips	(1)	39.54	6.84	4.34	1.92	46.55
	(2)	34.75	14.64	3.48	2.42	42.11
	(3)	32.97	16.00	5.20	2.86	39.85
Clay slips	(1)	11.12	61.68	21.01	1.11	5.11
	(2)	14.33	51.84	16.42	1.42	12.49
Sand		....	98.5	....	...	....

trol this tendency, it was decided to control two properties of the mix—potential tri-calcium silicate and silica ratio.

Moisture is controlled principally at the wash mill, since the moisture content of the kiln feed is dependent largely on the moisture of the marl slip.

Proportioning the stone, marl, and other materials, as well as avoiding complex calculations, are major features of a graphical control system, which it is the purpose of this article to describe.

First-Stage Proportioning The plant was designed for two-stage proportioning. The first stage consists of combining the four materials intermittently, usually two at a time, in a raw-grinding mill, which produces three types of slurries:

(1) Marl slip plus limestone....."High lime slurry"
(2) Marl slip plus dry clay or clay slip ....."low lime slurry"
(3) Marl slip plus sand (or sandy clay)....."High silica slurry"

The dry materials—crushed stone, sand, and dry clay—are fed from feed tables. Marl and clay slips are delivered to the mill by ferris wheels. Feed rates of each material are determined and adjusted regularly, but no effort is made to combine all four materials at once, due to rather wide variations in the composition of the materials, particularly the marl. Chemical control of this operation is just sufficient to insure that the batch (one blending tank) of slurry being ground at the time will fall within the range of compositions defining the desired one of the three types of slurries listed above.

Water may be metered into the raw mill when necessary, as when grinding large quantities of stone with marl slip, but ordinarily the moisture content of the marl slip is sufficient for good grinding and pumpability. The three types of slurry are stored in six air-agitated blending tanks until completion of the chemical analysis required for blending.

Proportioning Second-Stage Since few of the slurries ground in the raw mill are close to the desired kiln feed composition, it is essential that the three types of slurries be blended accurately, in order to minimize deviations in chemical properties of the mix.

Each of the blending tanks and kiln feed basins can be measured accurately, by means of specially-calibrated tapes, to determine the volume of slurry they contain. These measurements are recorded in "inches" of slurry, meaning the volume of slurry one inch in depth in a 55-ft. tank. It is thus possible to make quantitative transfers from one tank to another.

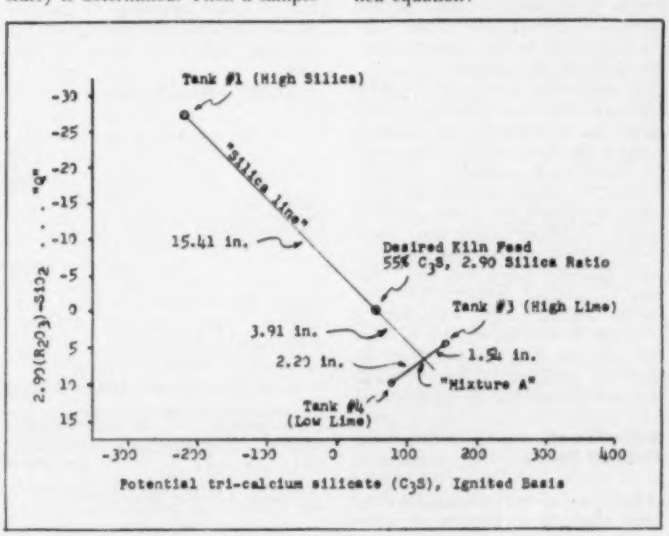
The two 55-ft. kiln feed basins are normally kept nearly full and used in parallel (as one tank) to minimize deviations caused by small errors in measurement and transfers.

Thorough Analysis Important A rather complete analysis of the slurry in each blending tank provides the data necessary for careful second-stage proportioning. First the moisture and specific gravity of each slurry is determined. Then a sample of the dry residue from each moisture test is clinkered at 2,400 deg. F. in a high-temperature furnace. The clinker buttons are then analyzed to determine the percent of ignition loss, silica, alumina, ferric oxide, and calcium oxide, the latter four on the ignited basis. From this analysis, then, mathematical coordinates are calculated, which make it possible to plot the chemical composition of each slurry on the control chart.

Graphical Solution A graphical method for proportioning slurries is described by L. A. Dahl in P.C.A. Bulletin No. 17. *Proportioning of Cement Raw Mixtures.* The author shows that it is advantageous to calculate by means of a graphical process the relative proportions of two or more slurries required to produce a kiln feed in which two important properties are fixed. In his illustrative example, Mr. Dahl used potential C_3S and C_3A as the properties being controlled. However, any two properties of a mixture of slurries which can be calculated by weighed averages can be controlled by means of such a chart.

In adapting this method to the solution of blending problems at Brandon, it was decided that the two properties which should be directly controlled were potential C_3S and silica ratio. The C_3A is controlled indirectly through selection of clay used in the mix.

Potential C_3S, or tri-calcium silicate, is calculated directly from the ignited analysis, using the simplified equation:



Right: Figure 2—Control chart.

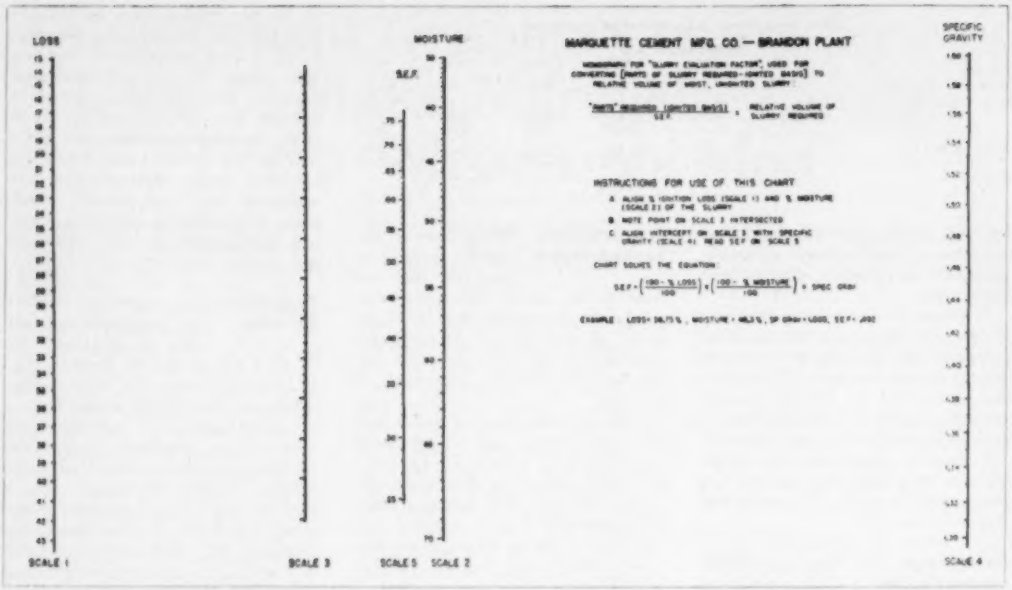


Figure 3—Nomograph used at Brandon

$C_3S = 4.07\ CaO - 7.6\ SiO_2 - 6.72\ Al_2O_3 - 1.43\ Fe_2O_3$

The silica ratio

$$\frac{SiO_2}{R_2O_3} \quad \text{or} \quad \frac{SiO_2}{(Al_2O_3 + Fe_2O_3)}$$

of a mixture cannot be calculated by the weighted averaging method, and hence cannot be plotted directly as silica ratio. Instead, as suggested by Karl Hauser, Marquette's technical assistant of operations, it is transformed into another quantity which involves the holding point for silica ratio, and which lends itself to the graphic method. This quantity, called "Q" for lack of a better term, is computed from the relation:

"Q" = (Holding Point) $R_2O_3 - SiO_2$

Either of the two quantities which serve as co-ordinates in plotting slurries on the control chart may be positive or negative. If "Q" is negative, it means that the silica ratio is higher than the holding point; if positive, the silica ratio is lower than the holding point. A high positive value for C_3S (this may be several hundred percent) merely indicates that the slurry is very much over-limed, and a negative percent C_3S means that the slurry is deficient in lime, containing too much clay or sand.

Selection of Holding Points To meet changing conditions, the holding points for C_3S and silica ratio have been changed a number of times since the Brandon plant went into operation. The principal consideration is, of course, the type of cement to be made from the clinker. The next consideration is maintaining the correct ratio of marl to stone, since a change in either holding point will affect this ratio. Other factors considered are the condition of the kiln lining and the state of training of the operators. Since the Brandon plant burns gas and also has a very low dust loss, it is not necessary to consider changes in chemical proportions of the kiln feed which occur in some kilns.

In the example which follows, taken from records of recent operations, clinker was being made for Type I cement. The holding points were 55 percent potential C_3S and 2.90 silica ratio. Beginning with the chemical analyses of three different blending tanks of slurry, the problem is worked out in detail, so that interested readers may check each step.

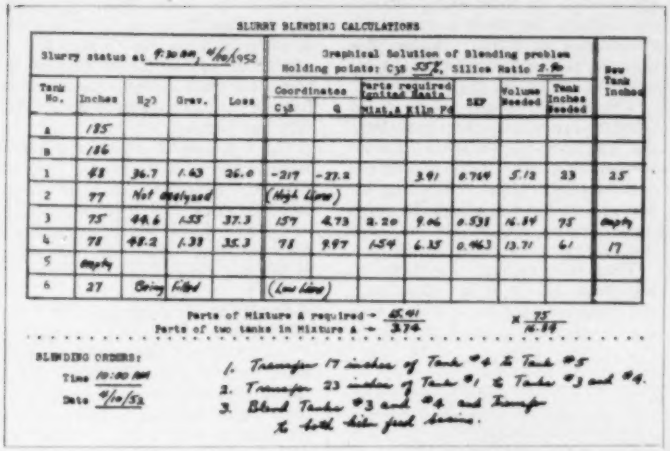
Typical Blending Problem Given the analytical data on three tanks of slurry as follows, determine whether kiln feed of the desired analysis can be made by blending portions of these tanks, and if so, what relative proportions of each tank are required:

Test Results	Tank 3 (High Lime)	Tank 4 (Low Lime)	Tank 1 (High Silica)
Moisture	44.6	48.2	36.7
Specific Gravity	1.55	1.38	1.63
Ignition Loss	37.3	35.3	26.0

Chemical Analysis, on Ignited Basis	Tank 3	Tank 4	Tank 1
Silica, SiO_2	15.25	19.18	46.18
R_2O_3	6.89	10.05	6.54
Alumina, Al_2O_3	4.04	6.51	4.12
Ferric oxide, Fe_2O_3	2.86	3.54	2.42
Lime, CaO	74.70	66.94	40.69

Note: (The ignited analysis is obtained by multiplying each result in the unignited analysis by the fraction $\frac{100}{100 - \%\ \text{Ignition Loss}}$

Co-ordinates for Plotting	Tank 3	Tank 4	Tank 1
Potential tri-calcium silicate	157	77.8	—216.6
Q	4.73	9.97	—27.2



SLURRY BLENDING CALCULATIONS

Slurry status at 9:30 AM, 9/10/1952 — Graphical Solution of Blending problem — Holding points: C_3S 55%, Silica Ratio 2.90

Tank No.	Inches	H_2O	Grav.	Loss	Coordinates C_3S	Coordinates Q	Parts required Ignited Basis Mix. A	Parts required Ignited Basis Kiln Fd	SEF	Volume Needed	Tank Inches Needed	New Tank Inches
A	185											
B	186											
1	48	36.7	1.43	26.0	-21.7	-27.2		3.91	0.749	5.12	23	25
2	77	Not analyzed			(High Lime)							
3	75	49.6	1.55	37.3	157	4.73	2.20	9.06	0.531	16.54	75	empty
4	78	48.2	1.33	35.3	78	9.97	1.54	6.35	0.963	13.71	61	17
5	empty											
6	27	Bring filled			(Low Lime)							

Parts of Mixture A required = 15.41 / 3.74 × 75 / 16.54

BLENDING ORDERS:
Time 10:00 AM
Date 9/10/52

1. Transfer 17 inches of Tank #4 to Tank #5
2. Transfer 23 inches of Tank #1 to Tanks #3 and #4.
3. Blend Tanks #3 and #4 and Transfer to both kiln feed basins.

Figure 4—Form for solution of entire blending problem.

Using the co-ordinates listed above, the three slurries are plotted on the control chart, as in Figure 2. The desired kiln feed is also plotted (at 55 C_3S and zero "Q"). It is seen at once that the three slurries form a triangle enclosing the kiln feed, which means that it is possible to make the desired kiln feed using a mixture of the three slurries.

Types of Slurries It happens that the marl, limestone, and much of the clay at Brandon all have silica ratios lower than the usual holding points for silica ratio. That is, slurries made with marl and clay or of marl and stone have a positive value for "Q" and lie below a horizontal line through "Kiln Feed". Thus any slurry composition which plots above kiln feed (where "Q" is called a "high silica" slurry. This does not mean that the percent of silica is necessarily high, but that the silica ratio is higher than that of kiln feed. As a general rule it is necessary to add fairly large amounts of sand or sandy clay to the marl to make a high silica slurry. It has been found advantageous to make the high silica slurries rather concentrated in silica, so that one tank of high silica will last for several days.

As soon as a high-silica tank is plotted on the chart, a "silica line" is drawn from the high silica point through the kiln feed point and extended downward. Slurry compositions falling to the right of this line (high in potential C_3S) are called "high lime" slurries, and slurries to the left of the line are called "low lime" slurries. Again, the term "low lime" does not mean that the slurry is lower in lime than "mix", but merely describes the position of a point on the chart with respect to the silica line.

To be able to blend kiln feed, then, it is necessary to have one high-silica tank, plus two other tanks, lower in silica ratio than "mix", one on each side of the "silica line". These three tanks form a triangle enclosing the kiln feed point.

Proportions Taken from Chart Once the slurry compositions are plotted, the remainder of the solution is very rapid, being purely mechanical. First, four measurements are made on the chart. In Figure 2 the figures given as dimensions refer to distances on the full-size chart in actual use at the Brandon plant, measured in inches with an engineer's scale. Referring to this drawing, it will be seen that 2.20 parts of Tank No. 3 plus 1.54 parts of Tank No. 4 would give a mixture falling exactly on the silica line. This intermediate mixture is called "Mixture A". If 15.41 parts of Mixture A were mixed with 3.91 parts of Tank No. 1, the result would be kiln feed of the desired composition. Note, however, that the "parts" of each tank required are on the *ignited basis,* since the chart is based on ignited analyses.

Conversion to Volumes of Slurry Having found the proportions for blending on the ignited basis, it is a simple matter to convert the results to the slurry basis. The "value" of a slurry, in terms of how much clinker can be produced from a given volume of slurry, is directly proportional to the specific gravity, and inversely proportional to the moisture content and ignition loss. These three factors are lumped together as a single factor which is called the "Slurry Evaluation Factor", or SEF.

$$SEF = \frac{(100 - \%\ \text{Ignition Loss})}{100} \times \frac{(100 - \%\ \text{Moisture})}{100} \times \text{specific gravity}$$

This factor can be calculated very quickly by use of a slide rule or, as at Brandon, with a nomograph (Figure 3).

We now divide the "parts required, ignited basis" of each slurry by its SEF, to get "relative volumes of slurry required", the proportions for blending. Actual volumes used will depend, of course, on the quantities of each slurry available. The relative volumes are usually scaled up proportionately, so that at least one of the three tanks involved in the blend can be emptied to provide room for raw grinding.

Form Simplifies Solution A form was designed for a systematic solution to the entire blending problem (figure 4). It serves as a permanent record of all measurements, factors, volumes, orders to operators who do the actual blending, and residual slurry in the system after the order is accomplished.

Tanks A and B are the kiln feed basins, and tanks 1 through 6 are blending tanks. Ordinarily, the slurry already in kiln feed tanks does not enter into blending calculations, except when it is desired to effect a change in the holding points, as when changing from one type clinker to another.

Data on moisture, specific gravity, and ignition loss are used to calculate the SEF. The co-ordinates of the blending tanks are listed just in case it is desired at some future date to reconstruct the problem on the chart.

Under the heading, "Parts required, Ignited Basis—Mixture A", the two indicated dimensions (2.20 and 1.54 in.) from the chart are entered. The sum of these two numbers (3.74) is entered in the denominator of the fraction at the

bottom of the form. Under "Parts required, Ignited Basis — Kiln Feed", the distance from the kiln feed point to "Mixture A" (3.91) is entered opposite the number of the high-silica tank. The other segment of the silica line (15.41) is entered in the numerator of the fraction at the bottom of the column. This fraction is now a factor which is multiplied by the two numbers under "Mixture A" to get the parts of these two tanks required in the kiln feed mixture. We now have the portions of each tank needed to make kiln feed, but on the ignited basis. When these three numbers are divided by their slurry evaluation factors, the result is volumetric proportions as slurry. These proportions are expanded by the factor below to empty one tank completely.

The quantities of slurry to be blended are then subtracted from the quantities in the tanks to show how much of each tank will be left over after the blend. Blending orders are designed to effect the necessary combination of slurries with the minimum of slurry handling.

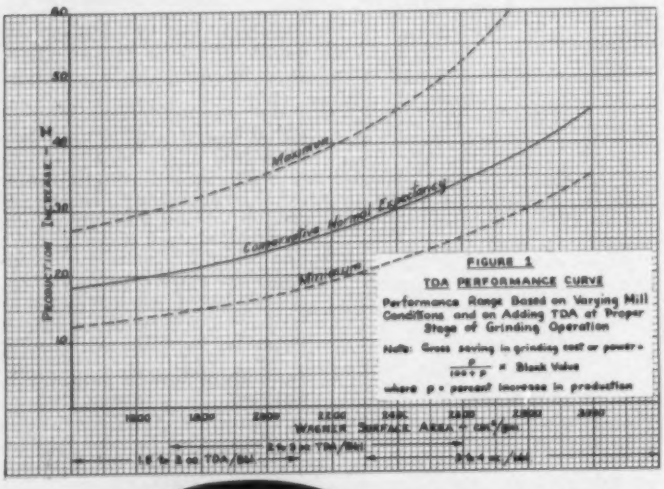
Thus, if one tank is empty, as was Tank No. 5 in the illustration, the required quantity of slurry from No. 4 can be isolated quickly by transferring 17 in. from No. 4 to No. 5. The 23 in. of No. 1 is then pumped to both No. 3 and No. 4 and these two tanks are blended in place to produce kiln feed, which may be transferred at once to the kiln feed basins.

On the control chart, the point representing Tank No. 3 would then be removed, and the point labelled Tank No. 4 would be redesignated Tank No. 5, to indicate the situation after the blending order was carried out.

Advantages of System Although at first reading the system just described may seem somewhat complicated, it has actually proved to be much simpler than other methods often used for four-component mixes, while insuring uniformity of kiln feed. Once the chemical analyses are obtained, which would be necessary with any control system at Brandon, the data is translated into kiln feed blending orders in less than five minutes by the use of the chart.

Because the control chart as used always gives an up-to-the-minute picture of the slurry status, it is a useful guide for supervisors directing raw-grinding operations. And since the analyses of individual raw materials can be plotted in the same way as slurries, the chart aids in planning quarry operations. In this sense, the chart serves for production control, as well as for purely chemical control.

As the reader has probably concluded, we at Brandon feel that our control chart has been a real boon in utilizing unusual raw materials for cement manufacture.


Mixture
Competitive Normal Experience
Minimum
PRODUCTION INCREASE - %
WAGNER SURFACE AREA - cm²/gm
FIGURE 1
TDA PERFORMANCE CURVE
Performance Range Based on Varying Mill Conditions and on Adding TDA at Proper Stage of Grinding Operation
Note: Gross saving in grinding cost or power =
p / (100 + p) × Block Value
where p = percent increase in production

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Labor Developments

(*From page* 123)

inesses, unable to resist union pressures, with resulting financial loss to a large number of commercial and industrial units which are necessary to our employment and production economy.

"8. Widespread development of these plans encouraged by virtual decontrol will divert billions of dollars into insurance and trust company treasuries, which in turn will flow back into the money market with broad inflationary impact."

Min & Chem, attractive publication of International Minerals & Chemical Corporation, announced its tenth birthday in the March-April issue. Conspicuously featured was a two-page review of the events chronicled in its pages during the first decade of its existence.

Canada Cement

(*From page* 134)

a 4,160-volt underground distribution system through the plant, with departmental load centers of capacities up to 1,000 kv.-a. for subordinate 550-volt power distribution. One 5,000-kv.-a. 3-phase, 69/4.16-kv. transformer provides all the power for the plant through C.G.E. Magnablast air-break Metal Clad substation switchgear, all of which is located in a concrete substation building. I.T.E. air circuit breakers were chosen for 550-volt service. The starters for the large synchronous motors were C.G.E. Limitamp air break, two-step, part-winding controllers, giving smooth mill starts.

An office and laboratory were built during the reinforced concrete construction. In the rear a scale was installed for weighing trucks. This building contains the offices of the superintendent, assistant superintendent, chief clerk, assistant chief clerk, and general accounting personnel, shipping department, and the first aid room. On the second floor are the offices of the chief chemist and the assistant chief chemist, and physical and chemical laboratories.

The field preliminary surveys for this plant were made early in October, 1950, and construction of camp buildings began immediately. Facilities were installed to house and feed about 300 men, the neighborhood supplying the remainder of the labor. The first concrete, a kiln pier, was poured on January 19, 1951, and progress was carried on steadily until the crusher building started operation in September, and the raw department on December 3. The kiln went into operation on December 20, and the first cement was ground on January 10, 1952. Shipments were not commenced immediately, until a cement stock was accumulated, but started on March 6.

The plant did not start up without the usual "new plant troubles". Very minor difficulties were encountered in the crushing and raw grinding end. The blending department, although having much equipment with which we were unfamiliar, gave us very little trouble; and the kiln presented the minimum amount of mechanical troubles. However, certain problems were experienced with the original feeding arrangement, which was gradually changed. Long de-aerating screws were installed, with a large-diameter slow-speed choke-type kiln screw feeder, to overcome unevenness in the kiln feed. Some ring formation was encountered, which was largely taken care of with improvement of the kiln feeder. The clinker mill and packing departments and the electrical distribution system gave us practically no trouble. Quality of cement has from the beginning exceeded specification and expectation.

Some other interesting obstacles to overcome were due primarily to climatic conditions. The kiln was started in temperatures from zero to about 10 degrees below zero, which meant that all lubricants and lubrication points had to be heated as a starting expedient. Also, due to the fact there is no regular circulation water through various departments for cooling, it was necessary to install individual fan-radiator-type cooling units, with antifreeze as the cooling medium. Widely fluctuating temperatures from zero or below, to well above freezing, occurring in a matter of hours, caused intense condensation on all machinery, motors, electrical equipment, and control panels, which of course made the starting under those conditions impossible. Strip heaters, application of outside heat, and temporary housing of equipment aided in starting operations. Each problem in itself was not of great extent, but under

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the pressure to get the plant into operation, they cumulatively presented a terrific obstacle.

Every effort was made to install dust collection equipment throughout the plant. Sly bag type dust collectors were used throughout, except where others are mentioned.

The major part of construction work was done by the personnel of Canada Cement Company Limited under the supervision of H. W. Hamilton, now plant superintendent, and A. N. Dicks, now assistant plant superintendent. Local workers were used in every possible case, as were local services and contractors. Carter Construction Company Limited did all moving form construction. Parsons Construction Company Ltd. built the office and machine shop buildings; Modern Construction Ltd. built a village of 14 dwellings for plant supervisory personnel. Rayner Construction Co. was awarded the earthwork contract, and Canadian Comstock Co. Ltd. did the electrical work. Custodis Canadian Chimney Co., and several steel erection companies were among those contributing to the construction. Design and layout were prepared by Canada Cement Company's engineering department.

Cement Burning

(*From page* 139)

with the major clinker compounds under the conditions prevailing in the clinkering zone.

In order to study the circulation of sulphate compounds in the rotary kiln, samples were drawn of the load along the whole length of the kiln. The results of this study are given in the diagram on page 136 (Figure 3).

The alkali content has not been determined. It is likely however, that the diagram for this component would show a similar course. Other factors being constant, the sulphate content of the clinker is determined by the factors which influence the volatilization in the clinkering zone and/or the condensing in the cool region of the kiln. Some of these factors will be dealt with later.

In the first place, the sulphate content is influenced by kiln performance. Short kilns with high exit gas temperature are apt to give clinker with lower sulphate content than long kilns with low exit gas temperature. The data given in Figure 4. indicate this clearly.

The considerable difference in sulphate content shown in the table is to a certain extent due to a higher dust loss for the shorter kiln.

Experience has shown that only a slight increase, namely 0, 1-0, 2 percent, in sulphate and alkali content results when the kiln exit gas temperature is reduced from 240 deg. C. (460 deg. F.) to 150 deg. C. (300 deg. F.).

One of the most decisive factors seems to be the degree to which the maximum capacity of the kiln is utilized. Figure 5 shows that there is a nearly straight line relationship between the kiln output and the sulphate content of the clinker. When kiln output increases, gas velocity and exit gas temperature increases; so does the dust loss. All these factors tend to lower the sulphate content. The author is inclined to believe that the main reason is a considerable rise in volatilization of sulphate in the clinkering zone, resulting when production is increased. Higher output means higher fuel consumption, hence less combustion space available per calorie evolved. The reduction zone around the flame will be extended and will come in closer contact with the kiln charge. Reducing atmosphere in contact with the kiln charge always excites a marked de-

AGITAIR Direct Fired, Hot Gas Generating

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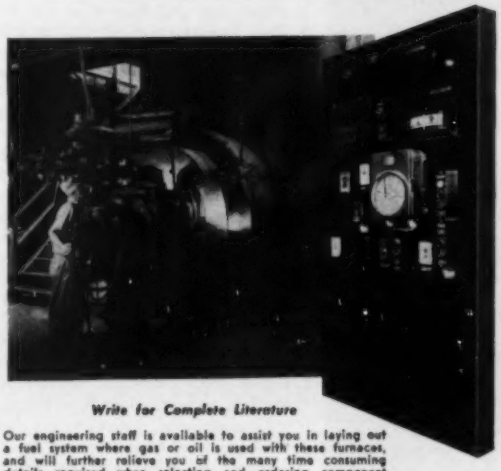

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Our engineering staff is available to assist you in laying out a fuel system where gas or oil is used with these furnaces, and will further relieve you of the many time consuming details required when selecting and ordering component accessories for same.

OIL OR GAS-FIRED—Designed to burn fuel oil, natural or manufactured gas, AGITAIR Furnaces help keep the cost of fuel to a minimum. These furnaces can be equipped for a combination of oil and gas firing, with either manual or automatic ignition.

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EFFICIENCY—There are no stack losses from AGITAIR Direct-Fired Furnaces—virtually all of the heat generated is utilized—the air cooled combustion chamber shell reduces radiation losses to a minimum—Overall efficiency of 90 to 95%.

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crease in sulphate content. Reducing atmosphere in the charge can be brought about in other ways, too; for example, by the introduction of a small amount of coke or coal directly into the charge or by adjusting the burner pipe so that the flame comes in closer contact with the charge.

There are numerous other factors influencing the sulphate content of the clinker. It is not proposed here to deal at great length with all these factors. Only some few will be mentioned briefly in the following. The sulphate content tends to increase slightly when the amount of excess combustion air increases. The size of the nodules is another factor. The bigger the nodules, the higher the sulphate content, other factors being constant. The degree of clinkering, which can be approximately measured by the liter weight of the clinker, is also of importance. The sulphate content tends to decrease with increasing clinker liter weight.

In modern kilns cross systems of special design below the chain section are sometimes installed. These devices will be referred to as quadrants, although the division of the kiln cross area brought about by this system is not always limited to four. In the upper part of the dewatering zone good heat interchange can be obtained by the installation of chains. In the lower part of the zone this system can not be exercised because of the grinding of the nodules. To facilitate the heat transmission in this zone, quadrants may be well suited. With respect to fuel economy, a good deal can be achieved by such an installation.

However, the system has some disadvantages which it is worth while to observe. When the kiln is provided with quadrants, the operator has one thing more to watch. The condition of the materials in the quadrants requires close supervision. Samples of the materials in the zone between the chain section and the quadrant must be taken frequently, and the moisture content must be determined. Facilities for such sampling must be arranged for. It is of great importance that the moisture content of the materials in this zone be kept between rather narrow limits. If the water content runs too high, the materials become sticky and the quadrant may clog up. This must be avoided by all means. If, on the other hand, the materials are too dry, they will be ground in the chain section, and excessive dusting will result. In addition to this, the relatively high temperature in the quadrant, which always occurs when the materials are too dry, may damage the metal of the quadrant.

When starting up a newly-lined kiln, it is an advantage to adjust the kiln process in such a manner that a durable coating on the lining builds up quickly. The skilled operator accomplishes this by employing a reducing atmosphere in the kiln. The consequence of this practice is, however, that the gas temperature in the dewatering zone of the kiln is reduced considerably, due to endothermic reaction taking place in this zone. ($C + CO_2 - 2CO$).

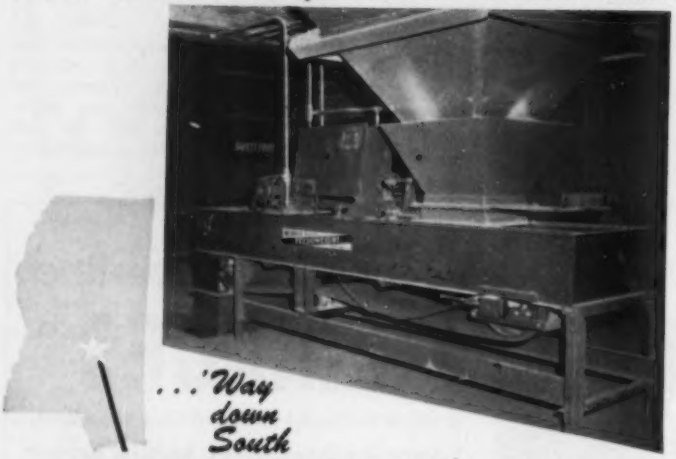
The water content of the materials entering the quadrant increases, and the quadrant may therefore clog up. Therefore the old well-known trick for attaining a durable coating on a new lining can not always be applied when the kiln is fitted with quadrants. In spite of the disadvantages mentioned, which make the kiln operation less flexible, quadrants may prove very useful. Nevertheless, the kiln requires close supervision.

Considerable attention has been paid during recent years to the problem of collecting dust in the exit gases and returning it to the kiln or utilizing in some other way.

The Modern Note

MERRICK SCALES

. . . in the country's newest Cement Plant



. . . 'Way down South

MARQUETTE CEMENT MANUFACTURING COMPANY

is operating a new cement plant at Brandon, Mississippi. With an annual capacity of 1,000,000 barrels of cement, this installation has the most advanced equipment available —proven by the fact that material feeding and proportioning jobs are handled by MERRICK Feedoweights.

The Merrick Feedoweight* is a constant weight conveyor type feeder, automatic in operation. Used to blend, proportion and feed to process such materials as clinker, gypsum, sand, gravel, limestone, etc. Capacities variable over a wide range.

The MERRICK Weightometer* provides an automatic and accurate weight record of bulk materials in transit over a conveyor.

MERRICK Weightometers and Feedoweights are standard in scores of plants throughout the world. Wherever the operation involves processing or handling bulk materials — look for MERRICK!

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MERRICK SCALE MFG. CO.

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As a rule the dust can be collected in dust filters of different types; but difficulties have been experienced with water vapor in the filters when the exit gas temperature runs too low. If the filter is adequately insulated, the exit gas temperature may run as low as 150 deg. C. (300 deg.F.) without any appreciable condensing. A further saving of calories through reduction of the exit gas temperature seems to be impeded because of accompanying condensation in the filter. All the methods which have been applied hitherto for conveying the dust back to the kiln are more or less encumbered by disadvantages. However, during the last few years considerable progress has been made with dust collecting systems arranged in the kiln. In the Scandinavian countries a system referred to as a slurry preheater is extensively used. This preheater is installed in the kiln near its inlet end. The pre-heater is a rather effective dust collector.

Experiences have shown that the dust loss is around 1 percent, figured on clinker output for a kiln with a pre-heater, as compared with around 3 percent for a similar kiln without a pre-heater. The preheater is easy to operate and needs little attention by the operator. It can be conveniently adjusted to meet any condition with regard to changes of the water content in the slurry.

Kiln fuel economy has been improved considerably, but much remains to be done along this line. While the most economical wet-process kilns require around 1,250 calories per kilo of clinker (850,000-B.t.u.'s per bbl. of clinker), the theoretical requirement is merely around 450 calories per kilo of clinker (300,000 B.t.u.'s per bbl. of clinker). The most urgent question today is to find ways for utilizing the latent heat in the exit gases and the heat which is lost by radiation from the kiln shell. The solution of these problems must not, however, be accompanied by a further complication with regard to kiln operation.

N.Y. Aggregate, R.M.C. Men Form State Association

The Empire State Sand, Gravel, and Ready-Mix Association recently held its first annual convention in Binghamton, N. Y.

The following officers were elected: president, Harry A. Barney, vice-president and general manager of Barney & Dickinson, Inc., Willow Point; vice-president, Leon H. Wendel, Lockport; treasurer, John B. Hopkins, Albany; and secretary, William Nass, Syracuse.

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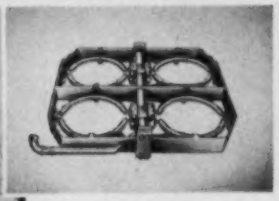
COLLECTING CEMENT DUST



AEROTURN'S
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BLOW RING CRADLE

Patented, fully automatic, self-adjusting, self-aligning blow ring assembly holds the rings snugly in contact with the wool felt filter bags at all times for maximum efficiency and filter bag service.

A typical case history of AEROTURN'S dust collecting performance.

Typical of many **Aeroturn** Dust Collector installations in the cement and rock products industries is this 15,000 C.F.M. unit collecting more than 6000 lbs. of fine rock dust every 24 hours of operation.

Aeroturn — featuring fully automatic "in service" cleaning of the wool felt filter bags — eliminates costly down-time for cleaning or expensive installations of multiple-compartment dust collectors. Pressure control of the automatic operation of the reverse-air-jet blow rings prevents overcleaning of filter bags and insures ultra-high filtering efficiency. Compact design saves erection and installation expense — requires minimum of valuable plant space — indoors and out.

Compare the rest with Aeroturn!

ADDITIONAL ADVANTAGES OF AEROTURN DUST COLLECTORS

1. *Compact and Lightweight Design.*
2. *Save on Erection and Transportation Costs.*
3. *Requires Minimum of Plant Space.*

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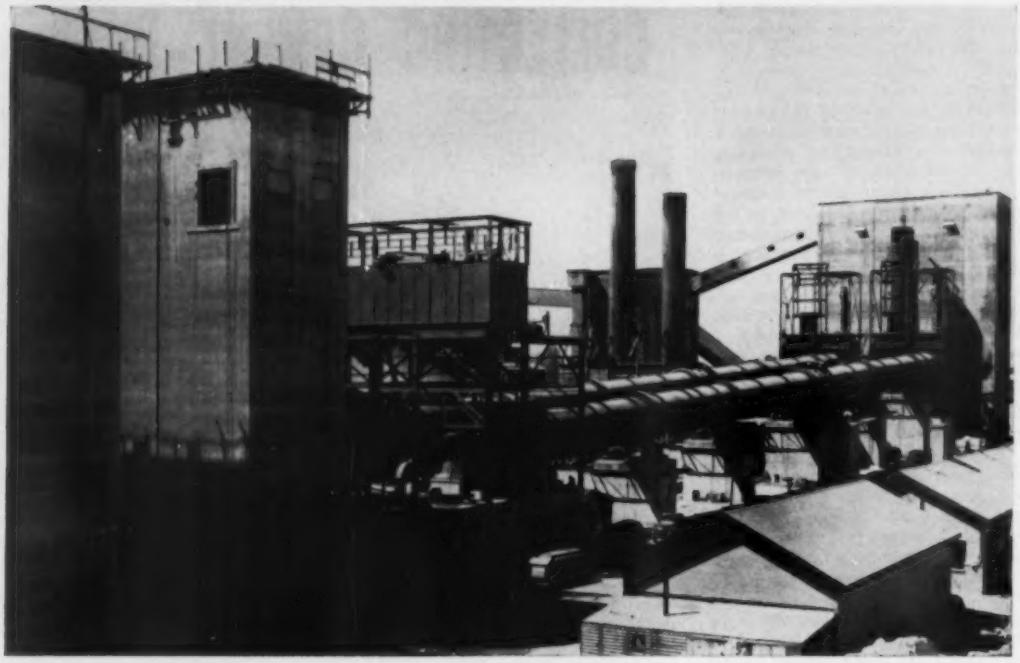

At Maple Grove, this new plant expansion of Basic Refractories, Inc. includes the installation of kilns 12 and 13. Adopting the convenience of space limitations with economy of construction, our design and construction of this complete unit included Macdonald system of slip form bins for raw materials at the kiln feed, finished products storage at the kiln discharge and coal bins for kiln fuel storage.

For design and construction of your new plant or extensions, contact us at any of our offices

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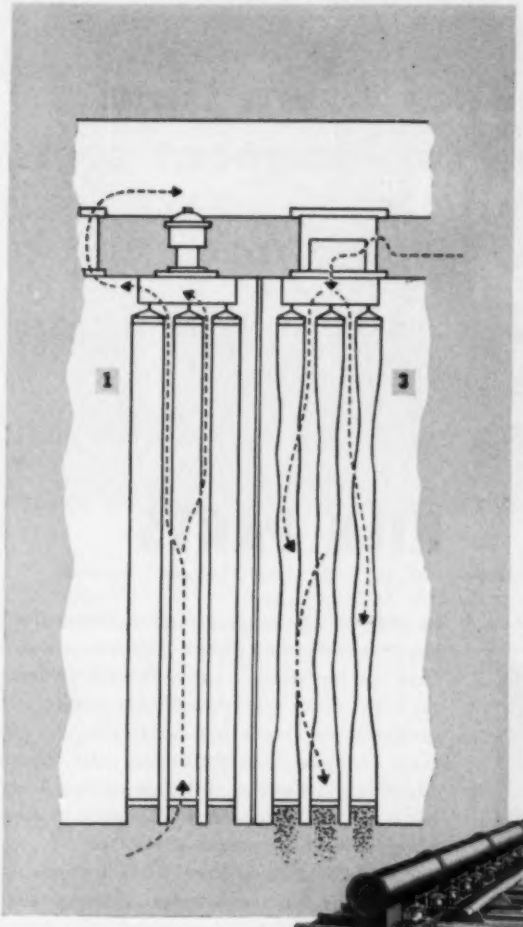

How Norblo gives you 24-hour-a-day dust collection at full rated capacity

Fast double-action bag cleaning assures full efficiency and constant suction drop across the arrester

No matter what the task in large scale continuous operation, Norblo equipment stands the gaff — with low maintenance and economical over-all cost. Norblo Automatic Bag Type Dust Collectors have been completely reliable in all types of installations for over 25 years, proving the soundness of the operating principles described below:

1 Basic unit compartment houses 78 cylindrical bags — fully distended by upward inside air flow.

2 Variable timing of cleaning cycle, easily adjusted according to dust load, insures constant volume of air handled and constant static pressure drop across the arrester.

3 Bag cleaning involves only one compartment at a time, and only a few seconds out of each hour of operation. During cleaning period bags are shaken and air flow is reversed, loosening dust and accelerating its descent into the hopper. *This double-action bag cleaning insures utmost efficiency of the equipment and in no way interrupts the suction drop.*

4 Any compartment may be cut out of operation for bag replacement or repair, all other compartments remaining in operation.

Norblo Equipment is completely designed and fabricated in our own shops and sold on the basis of *guaranteed performance.* Let us send you Bulletin 164-3.

THE NORTHERN BLOWER COMPANY

Engineered Dust Collection Systems for All Industries

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Reduce down time and replacement costs

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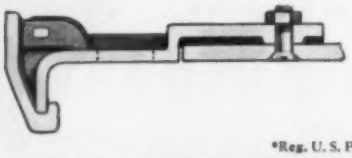
In scores of calcining operations, Thermalloy* has proved that it can materially reduce down time and replacement costs. This tough heat-resistant alloy was developed specifically to take heavy loads and rough usage . . . to resist corrosive gases, excessive heat (up to 2100° F) and abrasion. It is not just one alloy, but a *group* of alloys—each developed to meet a specific heat and abrasion problem.

For feed ends, feed pipe, kiln shell segments, grates and burner nozzles . . . investigate Thermalloy's superior heat and abrasion resistant properties. One of our sales engineers will gladly help you select the Thermalloy grade best suited to your application.

Call your nearest Electro-Alloys office, or write Electro-Alloys Division, 2036 Taylor Street, Elyria, Ohio.

Thermalloy "40" kiln feed end

Segmental Design Kiln End: Kiln is protected by high heat-resistant Thermalloy to distance of 16½" back from mouth. Shield casting easily replaced by knocking out pins.



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AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
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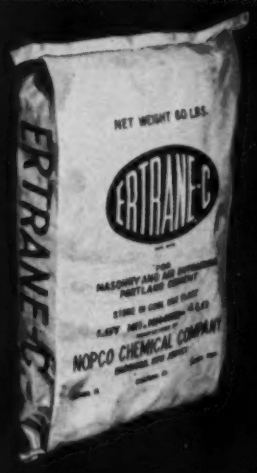

Low Cost Performance Makes NOPCO ERTRANE* C the Most Economical Air-Entraining Agent on the Market

SAVINGS IN TIME AND LABOR resulting from the use of Nopco Ertrane C — the new air-entraining agent that meets all requirements of ASTM specification C226-50T—*more than compensate* for the slightly higher initial cost of this outstanding Nopco product.

HERE'S WHY:

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Exhaustive tests have proven conclusively that Ertrane C not only imparts excellent durability and plasticity to concrete (through air formation), but *increases water-repellency.*

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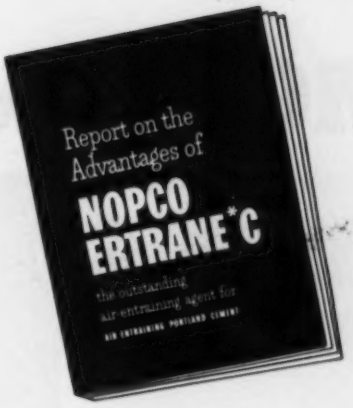

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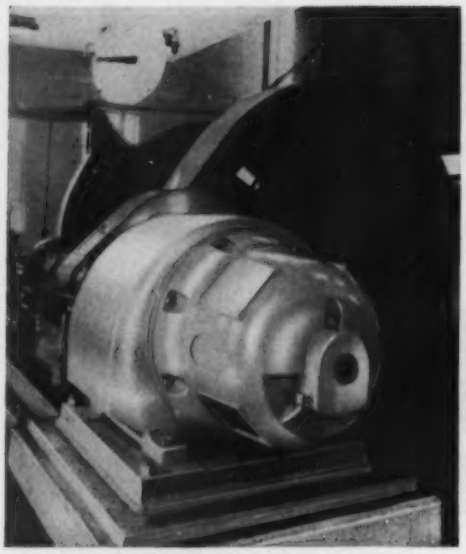

RELIABLE, EFFICIENT HAULAGE is provided by slope hoists such as this one, powered by a G-E wound-rotor induction motor, when rock must move up a steep grade from the quarry floor.

MORE TONS PER HOUR can be moved at lower cost per ton with G-E diesel-electric locomotives like this 65-ton switching unit. Trucks shuttle between quarry face and permanent railroad which runs to primary crushers. Flow of rock is thus maintained.

MOVE MORE ROCK

RUGGED QUARRYING is done by this 3 cu yd electric shovel, powered by G-E MD-600 motors which keep it loading "high-lime" rock to feed primary crusher.

TOUGHEST G-E MOTOR BUILT is the MD-600, made for heavy shovel duty. Hinged top cover permits easy maintenance—right on the shovel—without disturbing motor alignment.

MAXIMUM FLEXIBILITY of power supply is provided by G-E portable, cable-skid switch houses. Advancing with operating equipment, they assure better voltage at quarry face.

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A CONTINUOUS, HIGH-SPEED FLOW of crushed rock moves along this 30-inch conveyor which is driven by G-E motors. Material from primary crusher is rapidly carried to the cement plant a third of a mile away.

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AT LESS COST

Electrical modernization of your hoists and shovels, conveyors and haulage, can step up production schedules—boost cement output!

Your plant can increase cement production to new highs when rock is moved efficiently from quarry to primary crusher to mill. Modernization of this first important step in the cement-making process pays big dividends in greater output.

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the standard

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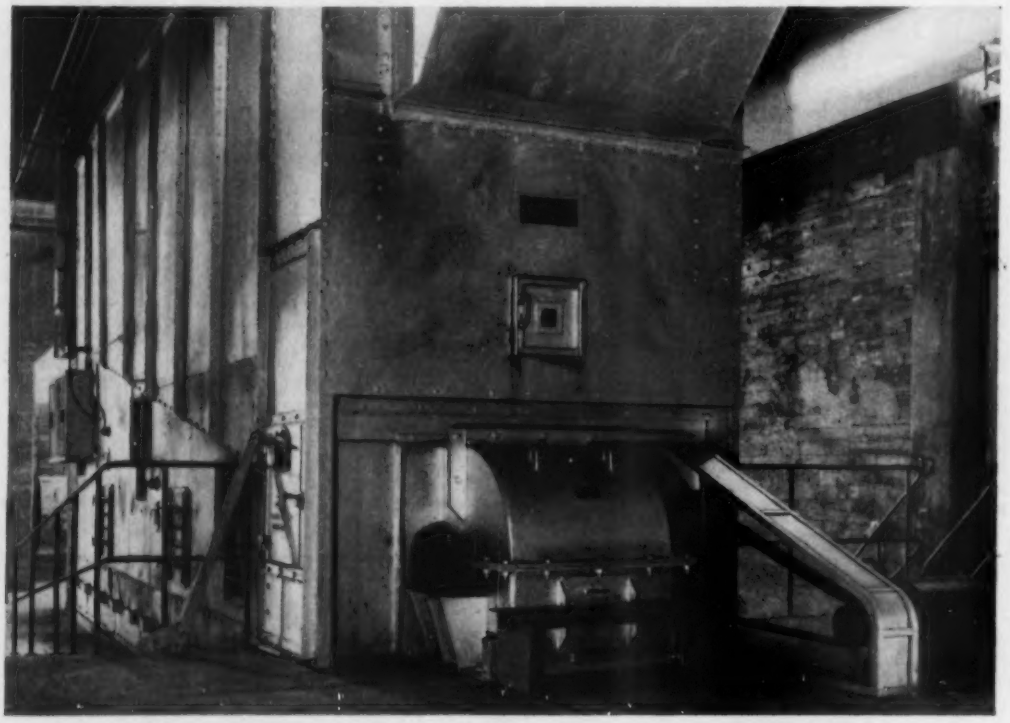
Heat removed in the cooling process is efficiently reclaimed by the application of the advanced design of Fuller Coolers, and made available as combustion air.

It was only natural that the Fuller Cooler should be successful and meet the requirements desired . . . conceived, designed, and built by engineers having many years of actual experience in the cement industry, who knew the problems of the industry and what was needed. With this experience and knowledge they set out to build, not just another cooler, but one that would actually meet the desired, peculiar requirements, in the most highly satisfactory manner.

This determination, and continuous application of experience, have had their reward, as is evidenced in the general acceptance by the industry, and the many coolers installed and on order. Many are repeat orders, due to the excellent performance of initial installations.

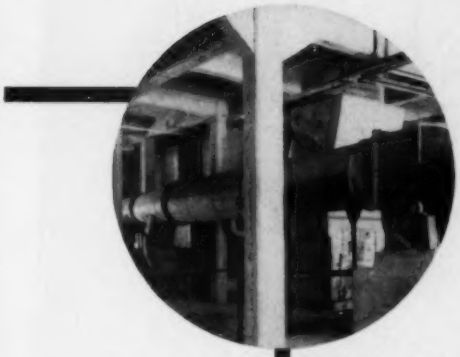
Fuller Coolers are currently handling materials like pebble lime, ores, dolomite, iron nodules, and Portland cement clinker at a rate of approximately 113,970 tons per day. This record has been built on a basis of advanced thinking and sound engineering . . . engineering that enables every installation to operate at maximum efficiency with minimum maintenance.

Take advantage of Fuller's long experience in materials handling and cooling . . . a talk with a Fuller engineer may lead to more profitable operation in your plant.



One of two Fuller Clinker Coolers installed in a southern cement plant, each equipped with a Fuller Clinker Breaker. Coolers are designed to cool 2210 barrels of clinker a day from approximately 2500-deg. fahr. to 150 degrees discharge, with cooling air at 80-deg. fahr. Air is supplied by a fan having a capacity of 33,660 c.f.m. at 6-inches static pressure; fan driven by a 50 hp. motor.

by which all others are measured



Cooler installed in a cement plant in Mexico, showing fan and air ducts to air chamber of cooler.

Two of four Fuller Clinker Coolers installed in a cement plant in California. Coolers are designed to cool 5000 barrels of clinker a day from approximately 2500-deg. fahr. to 150 degrees discharge.

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COMPRESSORS AND VACUUM PUMPS—
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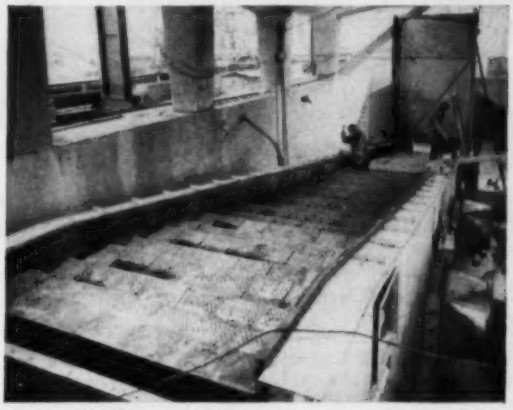
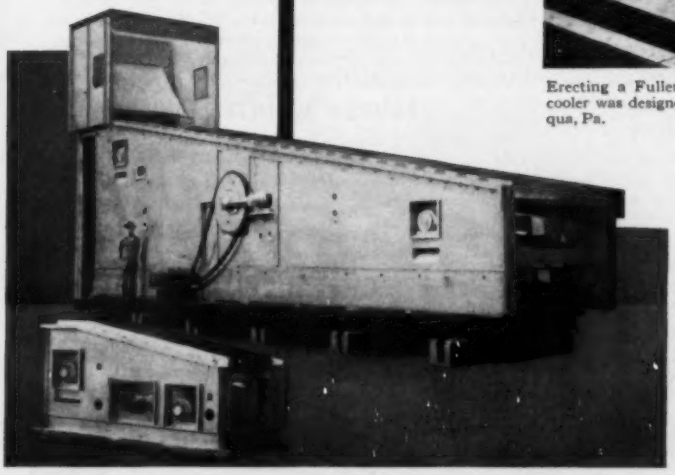


Erecting a Fuller Clinker Cooler in Holland, early 1951. This cooler was designed and built in Fuller Company shops, Catasauqua, Pa.



The largest and smallest cooler built. The large one is 7′ x 44′, and the small one is 3′ x 12′. The larger cooler was shop-erected and grates operated before being dismantled and shipped to the customer. The smaller cooler was shipped intact.

CO-28T
1686

Main Panel Board for control of 3000 bbl per day Kiln at Missouri Portland Cement Company, St. Louis, Missouri.

3 Ways Better

...Bailey Control for Rotary Kilns

Bailey Control for Rotary Kilns gives you better performance three ways:

1. Economical Operation
2. Uniform Quality of Product
3. Reduced Maintenance

These are advantages which can be achieved when all phases of kiln operation are coordinated to work together as a team. Here's how Bailey Kiln Control can help you get all three.

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With Bailey Combustion Control you can be certain that you are getting maximum product for every unit of fuel you burn. Bailey Control closely guards the Fuel-Air Ratio, Hood Draft, Fuel Feed, Clinker Cooling and the Temperature of Air for Combustion.

UNIFORM QUALITY OF PRODUCT

Bailey Instruments and Controls can help you achieve a uniform high grade product. Measurements of temperatures, kiln speed, combustibles content, and oxygen content can be transmitted to recorders on centrally located control boards like the one shown. There is no sacrifice of accuracy or speed of response. High temperature alarm contacts may also be provided with Bailey Pyrometers as a further aid in achieving optimum uniformity of product.

REDUCED MAINTENANCE

By maintaining uniform temperatures and excess air conditions in the kiln, Bailey Controls help to reduce to a minimum costly refractory repairs and wear and tear on auxiliary equipment.

Bailey Meter Company has a staff of engineers who are experts in the control of rotary kilns. Assure yourself of optimum kiln performance. Let one of these men help plan your Kiln Control System. P-22

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TEMPERATURE FLOW
PRESSURE LEVEL
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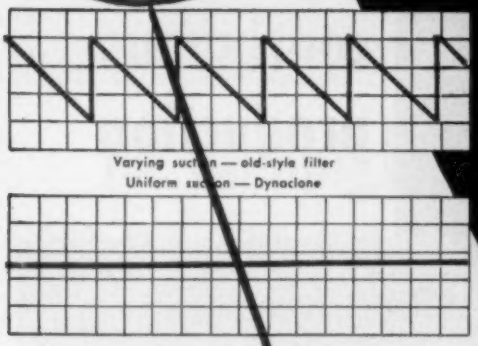

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Uniform suction — Dynaclone

1. Eliminates mechanical shaking.
2. Provides uniform suction at dust source.
3. Assures longer bag life . . . 4. minimum maintenance.
5. Keeps itself automatically and continuously clean without additional power or equipment.

Send for descriptive bulletin just out on the new Sly Dynaclone — the ultimate in filter performance.

This revolutionary new dust filter is another Sly first. Extremely simple and thoroughly dependable, it eliminates entirely the gremlin of mechanical shaking and provides uniform suction of air at dust source.

This uniform suction is achieved by a simple device which cleans the filter bags successively by a reverse flow of air—the same suction which draws the dust onto the filter cloth is reversed to blow it off.

Since this reverse air suction operates continually, the new Sly Filter requires no shutdowns for removing dust from the cloth.

No mechanical shaking or flexing device is needed, eliminating all strain and wear.

The [redacted] equipment [redacted] a very minimu

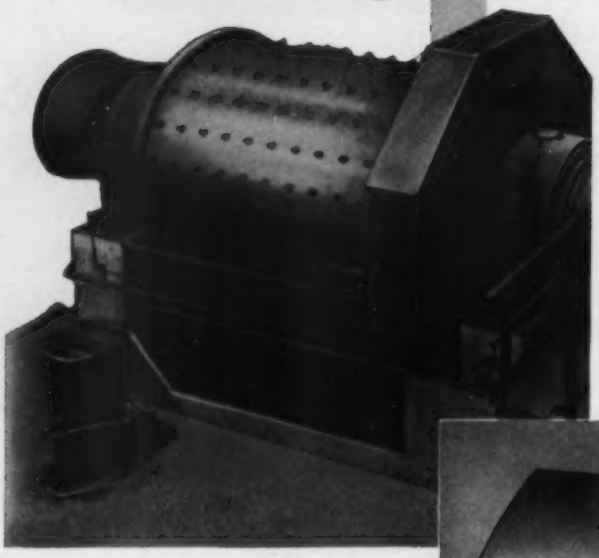
The result of long experimentation and exhaustive tests, the Sly Dynaclone has thoroughly proved itself. It provides substantial savings over any other type of cloth screen dust collection. Write for complete information.

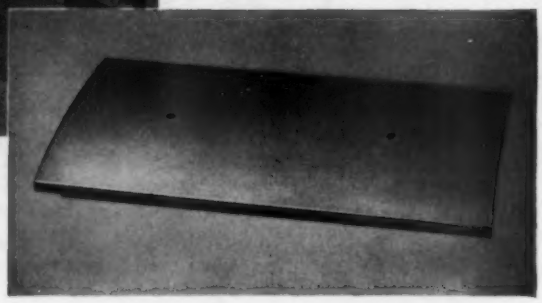
*PATENTED

SLY PIONEERS and LEADERS in INDUSTRIAL DUST CONTROL

THE W. W. SLY MANUFACTURING CO.
4745 Train Avenue • Cleveland 2, Ohio
NEW YORK • CHICAGO • PHILADELPHIA • SYRACUSE
DETROIT • BUFFALO • CINCINNATI • ST. LOUIS
MINNEAPOLIS • BIRMINGHAM • LOS ANGELES • TORONTO

rod mill liners of ABK METAL save money by providing extra life and continuous production





A large cement company in the Middle West had been using white iron liners in their rod mills—liners that lasted from three to five months in service.

Searching for a highly abrasion resistant material, they placed an order with American Brake Shoe Company, in 1947, for liners of ABK Metal and installed them in the same year. These and subsequently ordered ABK Metal liners are *still in service* at this particular plant. The reduction in replacement costs and the increased production effected substantial savings. Approximately 300 tons of liners are now in use in their mills.

If you are looking for an abrasion resistant metal, it will pay you to consider

ABK METAL *for better protection against abrasion*

AMERICAN Brake Shoe COMPANY

BRAKE SHOE AND CASTINGS DIVISION

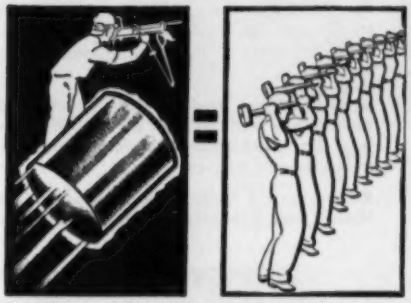
230 Park Avenue, New York 17, N. Y.

Do these jobs at lower cost:
• Remove clinker rings in kilns.
• Remove protruding rocks.
• Scale walls and ceilings of quarries, mines and tunnels.

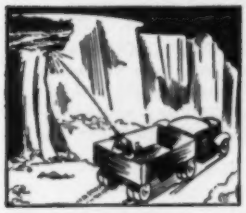
The Remington Industrial Gun will save you time and money!

Especially designed for the cement and mining industries . . . the new Remington Industrial Gun eliminates old-fashioned sledge-hammer methods of "barring out" clinker rings! One man operates it . . . firing a few well-placed shots that loosen the clinker ring and cause it to crumble when the kiln is rotated. There's no need to shut down the kiln and consume time cooling and reheating it.

For folder giving further information, write to Remington Arms Company, Inc., Bridgeport 2, Conn.



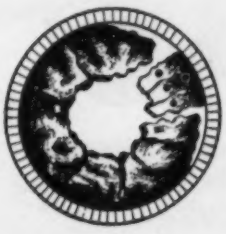
ONE MAN . . . OR MANY? The Remington Industrial Gun makes it possible for one man to destroy heavy obstructions that formerly required the time of several men with hand tools, working in restricted or hazardous positions.



The Remington Industrial Gun Has Many Uses

It's handy for scaling the ceilings and walls in mines. The illustration shows how the gun can be used to remove protruding rocks, ice and other obstructions at inaccessible points where conditions permit this kind of operation.

Remington Industrial Guns are leased—$200.00 the first year, $25.00 per year thereafter.



Cutting a "key way." A few well-placed shots will loosen a section of clinker . . . weaken the rest of the ring . . . usually cause it to fall when kiln is rotated.

Remington Industrial Shells are loaded with a powerful 3-ounce lead projectile that develops 7475 foot-pounds muzzle energy.

"If It's Remington—It's Right!"

Remington DUPONT

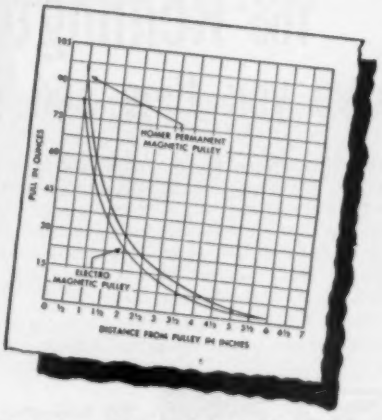
HOMERS.. Drafted for extended duty!

GUARANTEED HOMER PERMANENT MAGNETIC PULLEYS

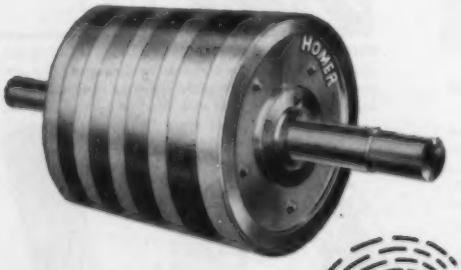
As specialists in heavy-duty magnetic separation problems, may we suggest, that if you have a tough magnetic pulley application, whether the service be for the removal of tramp iron, or the concentration of magnetic from non-magnetic substances, that you compare pulley test and operation data and probable maintenance and down-time costs carefully before you buy.

After you have made a thorough check of all conditions, we believe you will find that by comparison—Homers are proved best and most economical for top performance, long life and uninterrupted service.

Remember—if Homer recommends an installation for you . . . Homer will guarantee its recommendation.



The above heavy-duty performance curves were plotted from tests executed by our own engineering staff and by an outside testing laboratory. Literature, recommendations and estimates for the asking.



MAGNETIC PLATES
MAGNETIC PULLEYS
MAGNETIC DRUMS

HOMER

MAGNETIC TRAPS
MAGNETIC DUCTS
MAGNETIC SWEEPERS

THE HOMER MANUFACTURING CO. INC., DEPT. I-52 LIMA, OHIO, U. S. A.

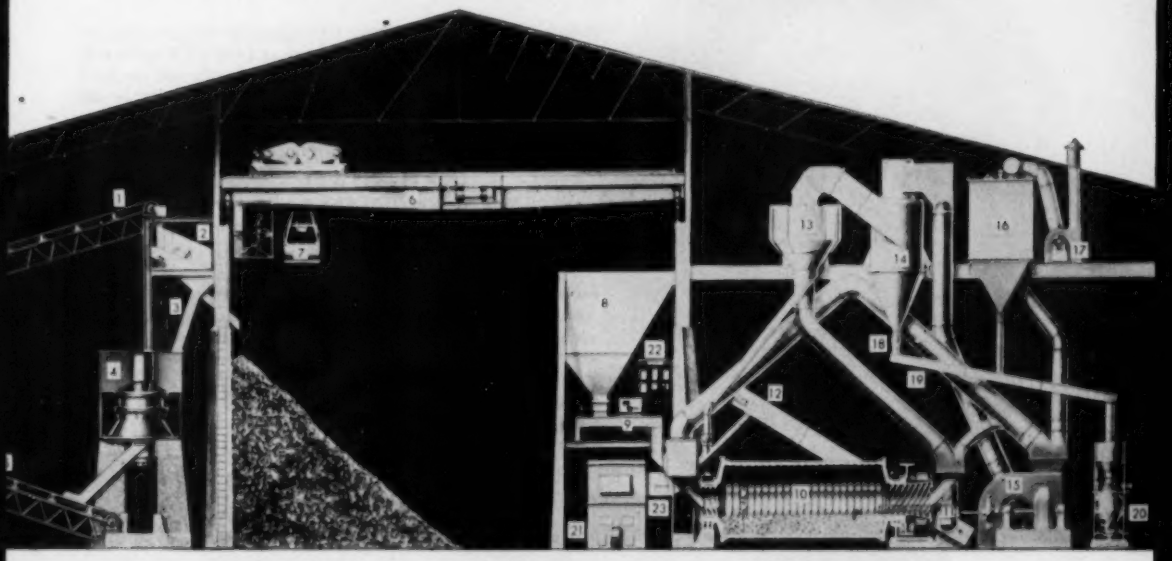
PRODUCERS OF MAGNETIC SEPARATOR EQUIPMENT SINCE 1923

KENNEDY STRATIFIED AIR SWEPT TUBE MILL SYSTEM

(Patents Pending)

WITH DUAL CLASSIFICATION

for raw stone, ore and clinker grinding lowers grinding costs...reduces power consumption...cuts maintenance costs



1 Belt conveyor—feed to crusher
2 Vibrating screen
3 Oversize return chute
4 Gearless gyratory crusher
5 Belt conveyor—closing crusher circuit
6 Traveling crane
7 Clamshell bucket
8 Mill feed hopper
9 Weighing feeder
10 Stratified Air Swept Tube Mill
11 Cross conveyor for oversize
12 Return conveyor for oversize
13 Radial flow classifier
14 Cyclone collector
15 Mill exhauster
16 Dust filter
17 Dust filter exhauster
18 Rotary air locks
19 Finished material conveyor
20 Finished material to storage silo
21 Hot air furnace
22 Instrument and control cubicle
23 Automatically controlled tempering air damper

The Kennedy Stratified Air Swept Tube Mill System produces 94% plus through 325 mesh when grinding clinker 2 inches and finer. It dries and grinds simultaneously and air-cools cement while grinding clinker.

In our test plant, when grinding to 92% through 200 mesh, 100 tests showed an increase in the capacity of the Tube Mill by the use of Dual Classification of from 29% to 52%.

The Kennedy Stratified Air Swept Tube Mill not only grinds raw material having up to 20% moisture, but becomes a combined dryer, grinding mill and separator, thereby serving a threefold purpose.

Marked economy of operation sets the Kennedy mill apart. By comparison, the savings effected in power consumption, wear-and-tear and man-hours, more than pay the initial installation cost within a 4-year or shorter period. Send for blueprints and operating data. They show why users say "It Costs Less To Own The Best."

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY - VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK

FACTORY DANVILLE, PA.

Here's Efficiency... right

Kennedy Rotary Kilns...Engineered and of Cement . . . at Production Costs

Rotary Kilns, engineered by KVS produce uniform quality and maximum quantities of cement at LOWEST operating costs! Service records and case histories, gathered on KVS installations all over the world, prove our methods are

KENNEDY ROTARY RIDING RINGS FORGED IN THE KVS FOUNDRY

Outside diameter,	**11' x 11"**
Thickness,	**8"**
Face width,	**22"**
Weight,	**22,600 lbs.**

Riding ring illustrated is forged, ready for machining.

All materials used in the construction of KVS equipment is specially selected and tested chemically and physically to determine unvarying standards of strength and durability.

Foundry facilities permit pours up to 90,000 lbs., indicative of KVS ability to handle castings and forgings of large size.

KVS have available bulletins describing their rotary kilns and equipment. Send for this data.

out where you can see it!

Built to Produce Maximum Quantities that Defy Competition . . . . . .

without a peer from any standpoint of performance or maintenance.

As an integral part of a modern cement plant, KVS kilns, built section by section, provide unrivaled facilities for the scientific and systematic production of fine quality cement required of a rotary kiln. Firing hood, control panel, riding rings, supporting rollers, gears and rotary kiln drives are engineered to operate year-in, year-out, with an absolute minimum of wear or time lost for repairs and maintenance.

Let our engineering department show you flow charts of KVS plants which are delivering record totals of products at consistently LOW COST PER TON. KVS materials are normalized and subjected to continuous chemical and physical tests to insure a high degree of strength and durability. Add to this, KVS unmatched engineering skill and you'll see why users say: "It Costs Less to Own the Best."

FIRING HOOD OF ROTARY KILN

With Special KVS Flange Extension for Air Seal Between Hood and Kiln Shell

Built to rigid specifications, KVS Firing Hoods are carefully fitted to kiln shells to conserve heat.

Other special KVS features are mounting on four car wheels for ease of moving; entrance door, large enough for a man to enter, for inspection of interior or repair of fire brick. Peep holes and barring holes are provided. Heavy, welded construction assures lasting service.

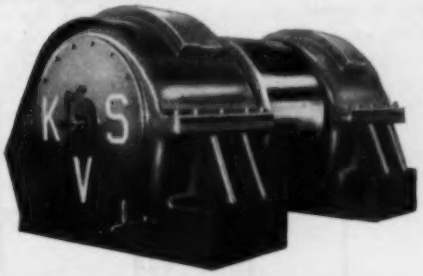
KENNEDY RIDING RING SUPPORTING ROLLERS

Internally Water Cooled . . .

Mounted on Self-Aligning Bearings

Made of open hearth cast steel with shaft cast integral, sturdy, strong, built to carry heavy-duty riding rings smoothly.

Lubrication by automatic ferris wheel type system with lower bearing forming an oil reservoir holding lubricant. Bearing is completely equipped with oil and dust-tight seal; asbestos guards protect against radiation from kiln shell.



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TWO PARK AVENUE, NEW YORK

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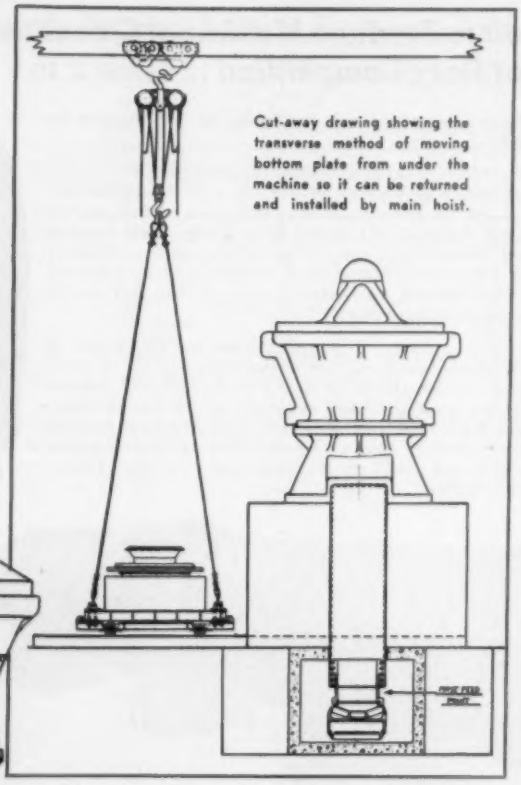
AGAIN... KENNEDY



Cut-away drawing showing the transverse method of moving bottom plate from under the machine so it can be returned and installed by main hoist.

Please observe that the hoist for erecting the crusher is also used to raise and lower the bottom plates with wire ropes. Undependable operation of hydraulic jacks eliminated and crusher erected in 10 minutes by this method.

The reinforced concrete floor acts as a screen to prevent any dust from getting into moving parts of crusher or motor.

Exhaust, carrying air to remote points.

PRESENTS AN INNOVATION IN CRUSHING EQUIPMENT!

NEW GYRATORY CRUSHER WITH DUAL DISCHARGE OUTLETS INCREASES OUTPUT, EFFICIENCY AND LONGER WEAR

Only KENNEDY has the correct answer to the "Sticky Ore" problem! KENNEDY Gearless Gyratory Crushers are now built with TWO DISCHARGE OUTLETS plus an exclusive "No-Stick" feature that doubles efficiency and output. This distinct innovation in crusher design is another "FIRST" for the world-famous line of KENNEDY crushing equipment.

CHECK THESE FEATURES

Synchronous motor built into pulley assembly

•

Smooth frictionless operation because the crusher is gearless

•

Power used ONLY for crushing

•

All moving parts carried on self-aligning roller bearings.

•

KVS forced-feed oiling system pumps four barrels of oil per hour through bearings without waste

•

Eccentric and ball are spray babbited. NONE has been rebabbited in over three years

Hard-to-crush rock and ore such as limestone, trap rock, basalt, taconite, slag, etc., *containing as high as 50% clay*, can be handled without sticking or clogging, by the exclusive KVS process.

No other crusher offers this advantage. Double discharge outlets, built at angle of 70° degrees, assures uninterrupted delivery of material. Other crushers, with single 42° degree outlets, operate more slowly because the discharge outlet becomes clogged with sticky clay or taconite ore.

In the new KVS crushers, rock and ore pass through mantle and concaves at bottom. A vertical drop of 6 feet then quickly and surely disgorges sticky clay, etc.—greatly speed production by eliminating clogging—saves countless man hours clearing stalled crushers.

Send for bulletins describing all types of KVS crushers.
Let us prove that "It Costs Less To Own The Best".

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY - VAN SAUN
MANUFACTURING & ENGINEERING CORPORATION
TWO PARK AVENUE, NEW YORK
FACTORY DANVILLE, PA.

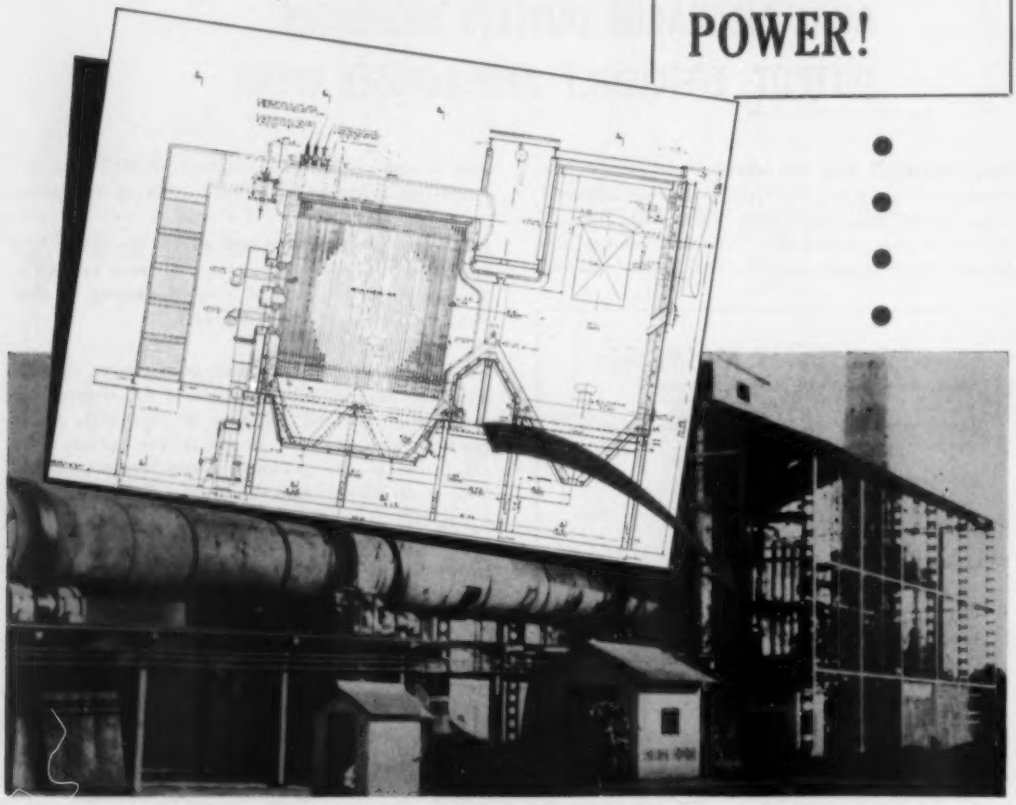
Let KVS design a waste boiler for your plant. **Utilize the heat that otherwise is wasted up the stack!**

Turn this valuable heat into FREE POWER . . . **save fuel . . . cut operating costs in the manufacture of cement, lime, dolomite, etc.**

Heat ordinarily wasted **at the end of the kiln shell, can be recovered and used to generate steam for power or processing. A waste heat boiler installation is a money saving and money making investment that pays dividends immediately.**

Consult our engineering department for details.

RECOVER WASTE HEAT WITH KVS WASTE HEAT BOILERS FOR FREE POWER!



IT COSTS LESS.. TO OWN THE BEST!

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TWO PARK AVENUE, NEW YORK
FACTORY DANVILLE, PA.

RESEARCH CORPORATION

Manufacturers of Cottrell Precipitators Since 1912

PLANT: BOUND BROOK, N. J. • NEW YORK OFFICE: 405 LEXINGTON AVE. • CHICAGO OFFICE: 122 SO. MICHIGAN AVE.

Research Corporation's experience in dust collection started in 1912. Today more than 1,200 Research Corporation Cottrell Precipitators are used by industry to remove materials suspended in gases, whether in the form of smoke, mist, fume, fog or dust.

New Plant

Our new plant at Boundbrook, N. J. is devoted exclusively to the design and manufacture of Cottrell Electrical Precipitators. Completed in 1949, it covers 18 acres and has 100,000 sq. ft. of working area. Under its roof are the most up-to-date facilities for manufacturing modern electrostatic precipitators by the latest and most efficient methods.

High Efficiency

The Cottrell Electrical Precipitator may be utilized under a wide range of conditions. It may be used for the removal of practically any material, whether solid or liquid, that is suspended in gas. The quantity of such material may range from a fraction of a grain up to more than 100 grains per cubic foot. Dependent upon the requirements of the problem, a removal up to more than 99% of the suspended material may be obtained. The gas may be handled at high or low temperatures and under conditions of either pressure or suction. Velocities through the precipitator are low, so that pressure drop is nominal and wear and tear from abrasion is negligible.

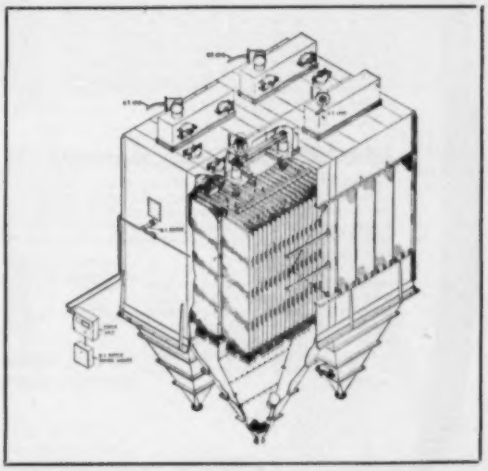
Research Program

Continual research and development has resulted in many improvements over the first Cottrell Precipitator. The research program provides an ever-widening fund of experience that is put to work for you. Here, for example, is a recent development that has solved important precipitator problems.

Continuous Rapping

Since the collecting electrodes gradually accumulate appreciable layers of precipitated dust, rappers are of vital importance. The rapping system used in the past was intermittent, i.e., the dust was shaken loose from the electrodes at periodic intervals. With this intermittent rapping and the plunger effect of large quantities of dust dropping into a hopper, there was considerable dust re-entrainment which resulted in rapping puffs.

After intensive study and field work, Research Corporation has finally developed a satisfactory solution to this problem. It involves continuous or sequential rapping, every minute or less, of electrodes at a controlled vibrational intensity. Collecting electrodes are thus cleaned at a continuous rate.



As a result of this new method, which has been proven in the field, there is no longer any need for the nuisance of intermittent puffs or clouding.

Actually, this continuous rapping at closely controlled intensity converts precipitation from a batch operation to a continuous and uniform process. This new system is known as Magnetic Impulse Rapping and is based on magnetic and electrical principles. Its basic parts are shown in Fig. 1.

Our staff of engineers will be glad to give you the details of many other design features of the Research Corporation Cottrell Precipitator and help you with your specific dust collection problems.

Before you buy *any* equipment for recovering dust or fly ash . . .

COMPARE ALL OTHERS against MULTICLONE'S Multiple Advantages

Because the advantages of MULTICLONE are so clear-cut, so vitally important, so far-reaching in the savings they make, we urge you to make a factual unbiased comparison of MULTICLONE dust and fly ash collection equipment against *any other* in the mechanical recovery field. Only by making such a comparison can you fully appreciate the major savings and greater performance you get by installing MULTICLONE Collectors!

COMPARE Recovery Efficiency!

It is a recognized fact that the separating efficiency of a cyclonic tube increases as the tube diameter decreases because smaller tubes generate greater centrifugal forces. The patented vane in the MULTICLONE makes the use of small tubes *practical* without complicated manifolding and permits compacting many small tubes into one simple, highly efficient unit. MULTICLONE's higher centrifugal forces throw out not only the large, medium and small particles, but also an unusually high percentage of the *extremely small* particles of 10 microns and less. Result—*more complete recovery of all suspended particles from the gas stream!*

COMPARE Space-Saving Compactness!

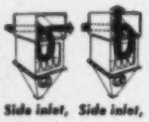
Plant space costs money—particularly at today's high construction costs. Because the MULTICLONE is more compact, size for size, it makes *really important* savings in space and plant costs. Note in the chart how the MULTICLONE requires substantially less space—*both in floor space and cubic space* —than any other unit of comparable capacity and performance. *This means vital savings in construction costs!*

Make	Relative Space Requirements In Sq. Ft.	In Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.6
Collector B	5.9	3.2
Collector C	6.8	3.9

COMPARE Dollar-Saving Adaptability!

Savings in space is just one of many ways MULTICLONE reduces installation costs. Because the shape of the unit can be readily varied (long and narrow, short and wide, or square) to fit available spaces, the MULTICLONE can often be tucked into odd corners and waste areas too restricted for other equipment.

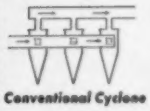
Moreover, inlet-outlet ducts can be varied—side-inlet side-outlet, or side-inlet top-outlet—to meet low headroom or restricted side clearance requirements . . . and the single-inlet single-outlet duct design permits greater flexibility and simpler installation. *These all add up to vital savings in installation costs!*



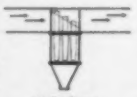
Side inlet, Side outlet *Side inlet, Top outlet*

COMPARE All-Around Simplicity!

The MULTICLONE is simple and inexpensive to maintain because there are no highspeed moving parts to repair or replace . . . no pads or filters to clean or renew . . . nothing to choke the gas flow or increase draft losses as suspended materials are recovered. In addition, the square, flat-sided shape of the MULTICLONE and its straight inlet and outlet ducts are far simpler to install and insulate. And since the recovered material from an entire bank of tubes is collected in a *single* hopper, it is much easier to service and maintain than the multiple hoppers of conventional cyclone units. *Here again, the MULTICLONE saves in many ways—all of them important!*

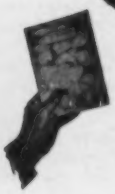


Conventional Cyclone



Multiclone

Whether your recovery installation is in a new structure or for modernizing present equipment, you will be far ahead by installing MULTICLONE Collectors. Our experienced engineers will gladly make helpful suggestions for simplifying your recovery problems. A letter, wire or call to our nearest office places this assistance at your service without obligation.



Send for Helpful Literature! This factual MULTICLONE literature explains the basic principles of cyclonic dust recovery and gives technical data helpful to anyone contemplating a dust or fly ash recovery installation. Write today for your free copy!

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

TAKING A DEEP BITE

in rock drilling costs

A few of the twenty FM-3 Wagon Drills at the Chief Joseph Dam.

THE FM-3 WAGON DRILL

...for maximum drilling power, easier operation, faster set-ups

One way to hold down the rising tide of today's rock drilling costs is to give your drilling crews more *efficient tools* to work with. On any sizeable rock drilling job, Ingersoll-Rand FM-3 Wagon Drills and Carset Jackbits can help you get more footage per shift without extra manpower.

The FM-3 Wagon Drill permits fast, easy drilling in any position. The rubber tired wheels, that can be turned 90 degrees, enable the drill to be moved quickly from hole to hole. A powerful worm gear mechanism easily raises or lowers the drill guide at the turn of a crank. And the heavy-duty X-71D drill, with air power feed is world known for its exceptional drilling speed and hole-cleaning ability.

Use the FM-3 Wagon Drill with longer lasting, faster cutting Ingersoll-Rand Carset Jackbits and you've got a combination that can speed up your rock drilling work all along the line. Ask your nearest I-R representative for further information.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

CARSET JACKBIT

749-5

ROCK DRILLS • COMPRESSORS • AIR-TOOLS • CENTRIFUGAL PUMPS • TURBO BLOWERS • CONDENSERS • DIESELS • GAS ENGINES

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11 Times for

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VICTOR CHEMICAL WORKS

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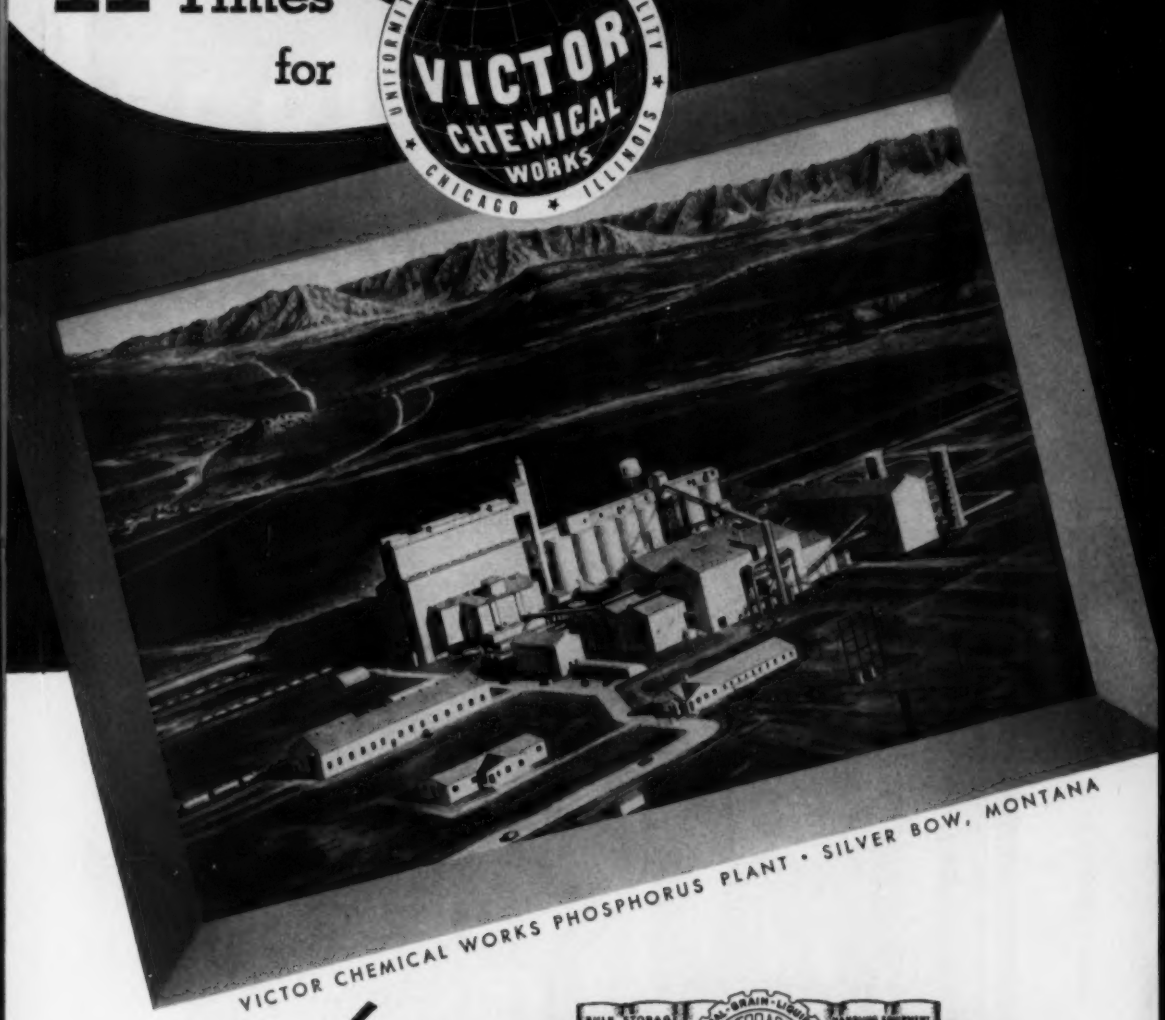

VICTOR CHEMICAL WORKS PHOSPHORUS PLANT • SILVER BOW, MONTANA

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BULK STORAGE · OIL · GRAIN · LIQUIDS · STORAGE · HANDLING EQUIPMENT

THE NICHOLSON CO.

CONSTRUCTION · CEMENT · OIL · CHEMICALS

11 TIMES — Victor Chemical Works has chosen *The Nicholson* Co. to build its ever expanding facilities. In your expansion or new construction take advantage of the NICHOLSON complete plant construction service as well as its 40 years of specialized design and building experience in the field of bulk materials storage and handling facilities.

10 ROCKEFELLER PLAZA • NEW YORK 20, N. Y.

12 Million Tons

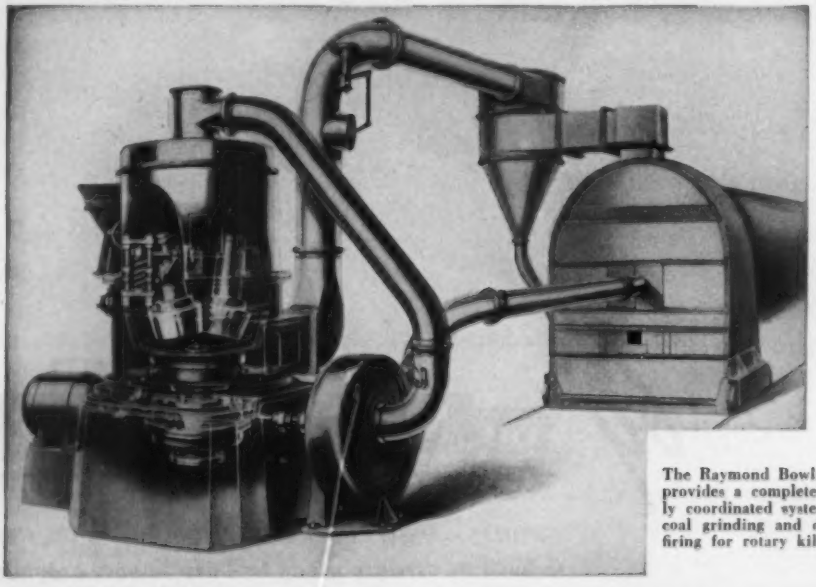
267 Units since 1935

The Raymond story of the Bowl Mill is told in convincing figures on the opposite page.

From the first three units installed in 1935, the number of Bowl Mills in operation has increased steadily to a total of 267 units to date. These are direct firing applications on cement, lime and dolomite kilns, and metallurgical processing furnaces.

This amazing growth in the use of Bowl Mill firing represents industry's appraisal of this modern unit in terms of operating economy and dependable service.

Its responsiveness to load changes, ease of control, high availability, and efficiency in handling coals of any grade or moisture content, are advantages that pay continuous dividends on your investment when you install a Raymond Bowl Mill.



The Raymond Bowl Mill provides a complete, fully coordinated system of coal grinding and direct firing for rotary kilns.

Raymond Bowl Mill Catalog No. 62

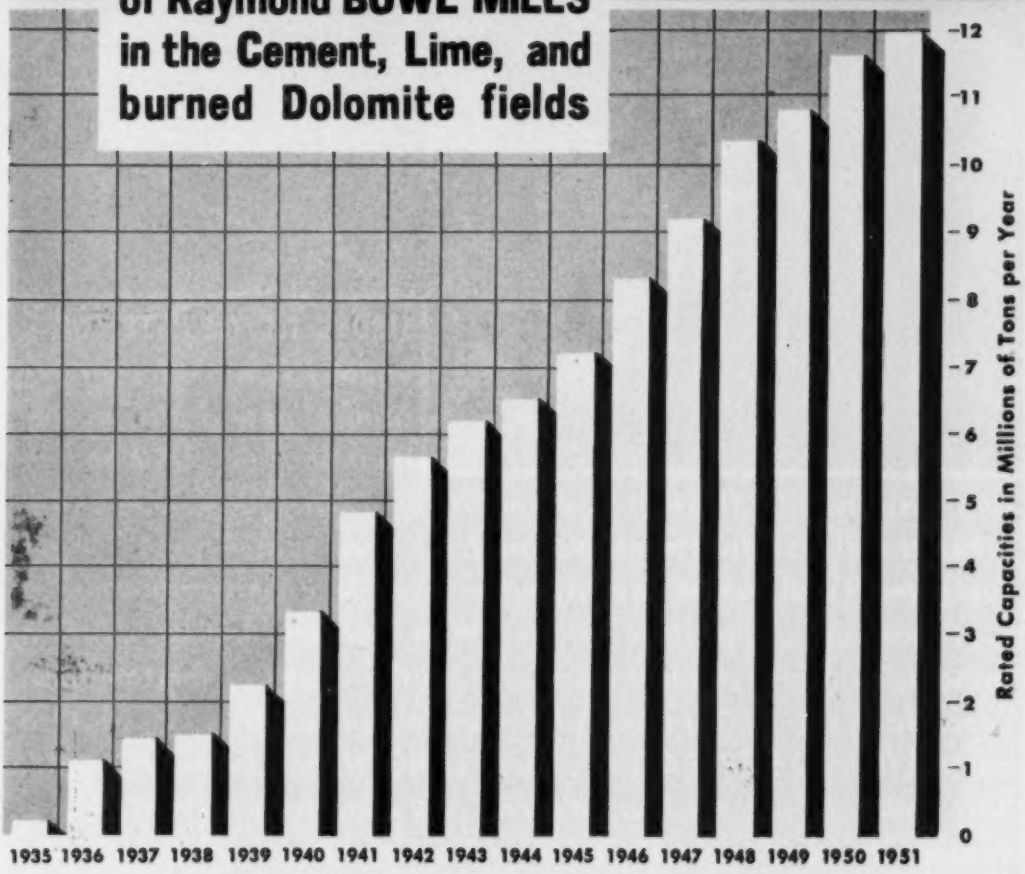
For further details, write for Bowl Mill Catalog No. 62

COMBUSTION

SALES OFFICES IN PRINCIPAL CITIES

# of Coal per Year

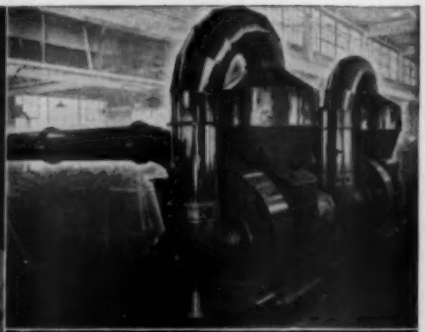
...present rated capacity of Raymond BOWL MILLS in the Cement, Lime, and burned Dolomite fields



SHOWING YEARLY GROWTH OF RAYMOND BOWL MILL FIRING

ENGINEERING-SUPERHEATER, INC.
RAYMOND PULVERIZER DIVISION
1321 North Branch St., Chicago 22, Illinois

BOWL MILL

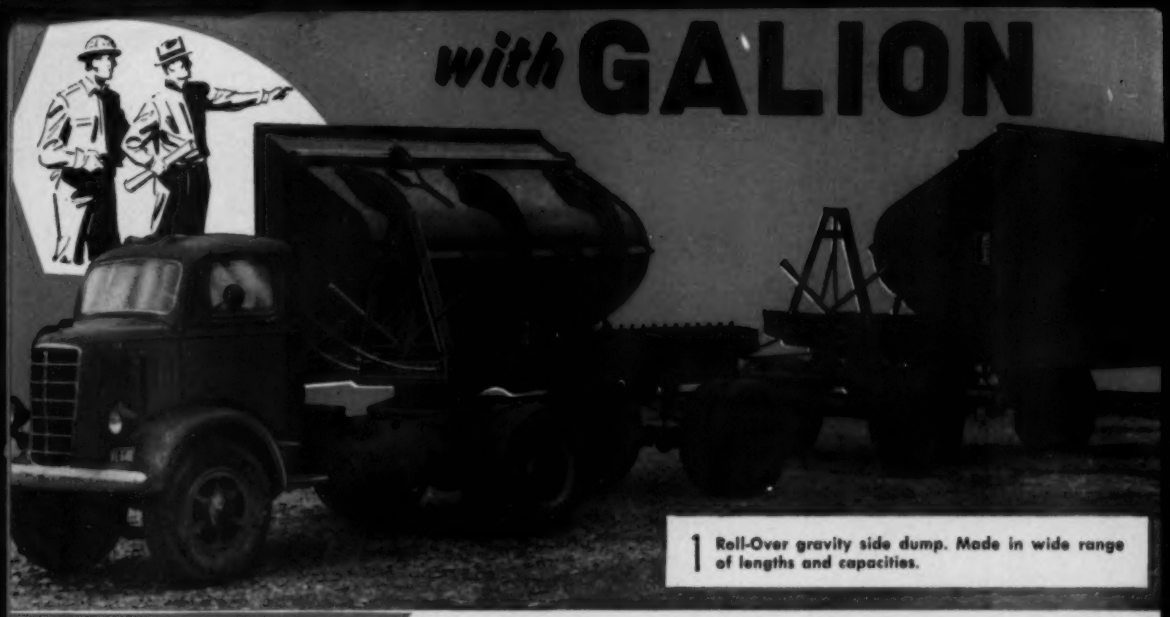


STRONG-SCOTT PULVERIZER is equally suitable for direct-firing kilns or driers, waste-heat or direct-fired boilers and is sufficiently flexible to permit its being applied to one or the other at will. Its adjustments also permit the use of a wide variety of fuels, and it will handle any bituminous coal mined in North America . . . regardless of moisture content. With uniform feeding, uniform grinding, uniform product passing from the classifier, and uniform secondary air mixture, all under easy control, it is possible to control flame TEMPERATURE, flame LENGTH, and flame VOLUME. This ability to put the heat WHERE you want it—and WHEN—is a feature that will appeal to every operator of a rotary kiln or dryer. STRONG-SCOTT Pulverizers are operating in some of the best-known cement and lime plants in the country . . . our engineers will gladly help you solve your BURNING or DRYING problems.

THE STRONG-SCOTT MFG. CO.

N. W. Terminal · Minneapolis 13 · Minnesota

with GALION



1 Roll-Over gravity side dump. Made in wide range of lengths and capacities.

you can match your hoist and body to your job

Before you invest in heavy duty haulage equipment, consult your GALION distributor

He will be glad to survey your requirements and give you the benefit of his extensive hoist and body experience.

There's no charge or obligation for this extra GALION service. But, it's sure to save you substantial amounts of time and money by putting the right GALION hoist and body in the right place.

Remember, if your requirements can't be met perfectly by standard GALION equipment, GALION will engineer, design and build special haulage units for you . . . will match your equipment to your job.

A-5802

2 Model No. 1000 heavy duty double lift arm hydraulic hoist easily handles 25 ton loads.

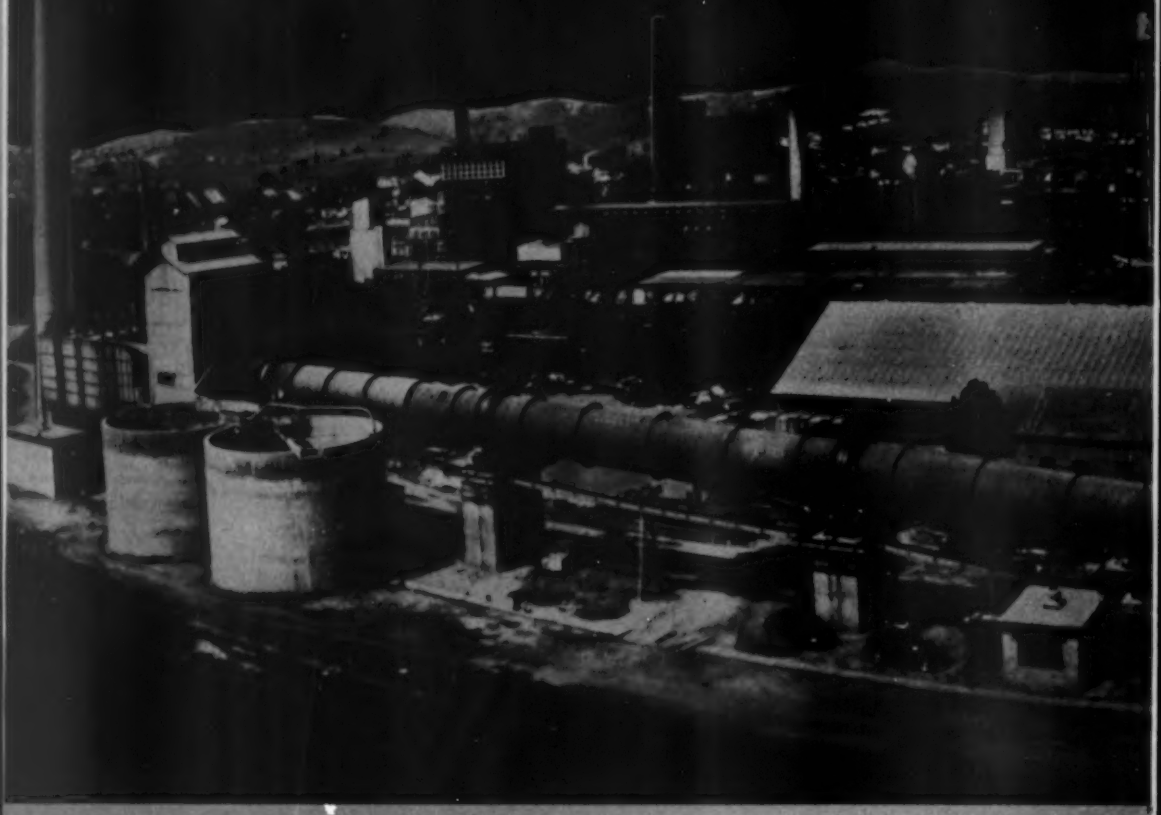
3 Closeup of 7" 3-sleeve twin telescopic hoist with automatic stop for bodies up to 25 ton capacity on tandem axle trucks.

4 16 ft. long trailer dump. Capacity of body is 11½ yd. sides and 16 yd. ends with 7" single sleeve twin telescopic hoist.

5 16 yd. sides and 20 yd. ends with semi-bay front body with 7", 3-stage twin telescopic hoist.

THE GALION ALLSTEEL BODY COMPANY • GALION, OHIO

SMIDTH



Longest Rotary Kiln in the Western Hemisphere.
500 feet long, 12 feet in diameter

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ROTARY KILNS

Designed and Furnished by Smidth for Penn-Dixie at Kingsport, Tenn.

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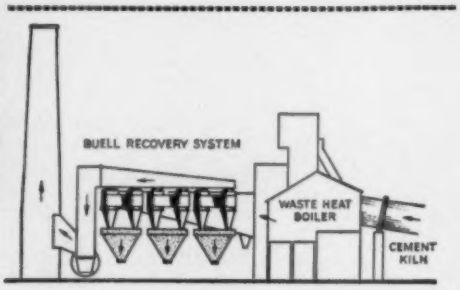
In Cement and Lime Kiln



Dust Recovery...

BUELL TOPS THEM ALL

Buell Recovers More Dust

High Cyclone efficiency... with the exclusive van Tongeren 'Shave-Off'... fits hand in glove with industry needs. Loss in the gas outlet consists mainly of alkalis, permitting the cement dust to be returned to kilns without any interruption to manufacturing operations.

Buell Cyclones Don't Plug

Large diameter cyclones and outlets just won't plug. All cyclones operate at same high efficiency... even gas distribution prevents overloading some cyclones while others loaf.

Wear Resistant, No Maintenance

Heavy steel plate construction and large diameter cyclones cut the abrasive effect of rock dust to a minimum. Cost of shutdowns, clogging and repairs at a practical zero.

BUELL 'SF' ELECTRIC PRECIPITATOR

for the collection and recovery of fine dusts, fumes and vapors features design advancements resulting in superior performance. Thoroughly proven by many installations it is available in sizes and types to meet specific requirements.

We will be glad to consult with you on your dust recovery problem. Buell Engineering Company, 70 Pine Street, Dept. 18-G, New York 5, N. Y.

buell

Engineered Efficiency in DUST RECOVERY

ALLIS-CHALMERS

Rotary Kilns

THE CHOICE OF LEADING U. S. CEMENT PRODUCERS

CEMENT OPERATORS have long recognized the splendid performance records of Allis-Chalmers rotary kilns — performance that is the result of Allis-Chalmers specialized engineering and years of experience in building *hundreds* of kilns.

Low production and maintenance costs...dependable performance year after year — these are solid, dollar-saving reasons why so many A-C rotary kilns are being installed in the cement industry today. A-3753

MARQUETTE CEMENT MFG. CO.
New 12 x 475-ft Allis-Chalmers rotary kiln at Brandon, Miss.

LONE STAR CEMENT CO.
Two 10 x 340-ft Allis-Chalmers rotary kilns at Sweetwater, Tex. Two Allis-Chalmers rotary kilns of same size at Roanoke, Va.

SO. DAKOTA STATE CEMENT CO.
Three Allis-Chalmers rotary kilns at Rapid City, So. Dak.
LOUISVILLE CEMENT CO.
Six Allis-Chalmers rotary kilns at Speed, Ind.
HURON PORTLAND CEMENT CO.
Eleven Allis-Chalmers rotary kilns at Alpena, Mich.
DEWEY PORTLAND CEMENT CO.
Six Allis-Chalmers rotary kilns at Davenport, Iowa.

Kiln installations shown here represent only a few of the leading U. S. cement producers who have installed Allis-Chalmers rotary kilns.

Important facts about *profitable* kiln operation can be obtained from the A-C representative in your area. Call him, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Rotary Kiln Bulletin 07B6368A.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

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COMPLETE DESIGN & CONSTRUCTION OF MODERN CEMENT MILLS

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ARE YOUR HEAT and ABRASION COSTS HIGH?

17½ ft. long dry process feed pipe

Minimize Maintenance Costs and Down-Time with

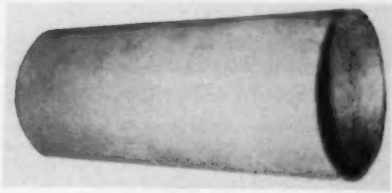
CARONDELET CASTINGS

"Choke" ring casting

"Nose" ring castings

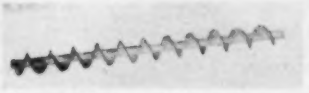
HEAT RESISTANT CASTINGS . . .

Flexibility of electric melting and moulding facilities backed up with a long experience of producing chromium-nickel alloys makes Carondelet an excellent choice for the production of your heat resistant castings. Recent installation of additional electric furnace capacity and spectographic analysis equipment assures improved service and a further check on metal quality.



Coal feed pipe

Cooler grate

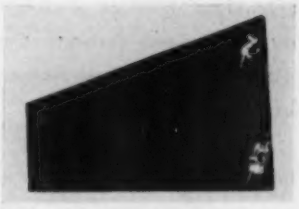


▲ 12 ft. long hot flue dust conveyor

▲ Mill liners

ABRASION RESISTANT CASTINGS . . . .

The Cement Industry has been acquainted with Ni-Hard for many years but is presently considerably expanding its use of this hard abrasion resistant alloy. We are currently producing sound electric furnace melted Ni-Hard, cast in most sizes and shapes, and shall be pleased to advise you regarding its use in your mill. Other abrasion resistant compositions are available when warranted.



▲ Air separator liner

▼ Slurry pump case

Licensed Producer of Ni-Hard and Ni-Resist

CARONDELET FOUNDRY COMPANY

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NI-HARD widely used ...where abrasion is severe

ONE OF THE HARDEST commercial products of the iron foundry is a *nickel-chromium white cast iron* trade-named "NI-HARD*".

HARDNESS RANGE

Its Brinell hardness ranges from 550 to 650 when sand cast, and 600 to 725 when chill cast.

This extreme hardness . . . at the moderate price of NI-HARD . . . provides abrasion resistance at lowest ultimate cost.

STRUCTURE

Unlike other cast irons . . . NI-HARD comprises a multitude of hard carbides firmly embedded in a matrix which is as hard as fully hardened steel. NI-HARD is unmachinable except in special cases. Finishing requirements are met by grinding or the use of cast-in-place machinable inserts.

PERFORMANCE

NI-HARD develops abrasion resistance two to three times better than that of unalloyed white iron. Therefore NI-HARD can economically replace white iron.

NI-HARD lasts one and one-half to two times as long as austenitic manganese or carbon steels, under conditions involving only moderate impact. Chill cast parts are stronger and more abrasion-resistant than comparable sand castings.

STRESS RELIEF

The strength and toughness of NI-HARD castings are increased fifty to eighty per cent, without loss in hardness or abrasion resistance, by a stress relieving treatment at 400-450°F. User experience has demonstrated the merit of specifying this treatment.

APPLICATIONS

Applications include: grinding balls, ball and rod mill liners, slurry pump parts, flotation impellers, piping, scoop lips, classifier shoes, roll heads, pulverizer rings, chutes and hopper liners, muller tires, plows, pug mill knives, clay augers. Also coke grizzly discs, crusher rolls, coal mine pumps, dredge pump impellers, liners, rings and sleeves. Also industrial food grinding burrs and attrition mill plates.

AVAILABILITY

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of NI-HARD for many end uses in defense and defense supporting industries. There are authorized foundries, from coast to coast, equipped to quote you on NI-HARD castings in all common forms and shapes.

INFORMATION AVAILABLE

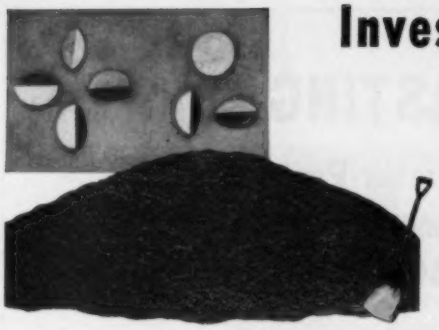
Write for the booklets, "Engineering Properties and Applications of NI-HARD", and, "Buyers Guide for NI-HARD Castings."

*Reg. U. S. Pat. Off.

EMBLEM OF INCO SERVICE
TRADE MARK

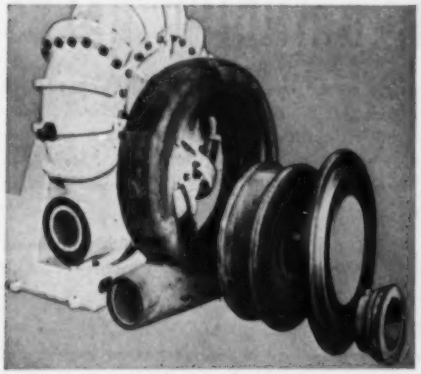
THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Investigate NI-HARD for your ABRASION PROBLEMS



SEE FOR YOURSELF why NI-HARD cuts grinding costs. Unlike other cast irons, NI-HARD is composed of a multitude of hard carbides firmly embedded in a matrix which is as hard as fully hardened steel. Ni-Hard balls are produced in sizes from ⅝" to 1¼". Balls at left above are sectioned to show soundness.

THESE BALL MILL LINERS of chilled NI-HARD replace rolled steel liners for milling ores. The user previously used all types of liner materials, including manganese steel, chilled iron, etc., before standardizing on NI-HARD.



SOLIDS-HANDLING PUMP PARTS, produced to take full advantage of NI-HARD, include impellers, shell liners, suction side liners, engine side liners, throat and seal rings.

NI-HARD is produced by authorized foundries from coast to coast

Ni-Hard® . . . an abrasion-resisting nickel iron . . . has proved the answer to hundreds of problems involving severe abrasive wear. During the past 20 years it has set notable records for length of service, down-time saving and *ultimate economy* where wear-resistance is the primary requirement. A few typical Ni-Hard applications are illustrated.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of NI-HARD for many end uses in defense and defense supporting industries. There are authorized foundries, from coast to coast, equipped to produce NI-HARD castings in all common forms and shapes.

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The Babcock & Wilcox Co.
85 Liberty St.
New York 6, N. Y.
(Plant: Barberton, Ohio)

Brake Shoe & Castings Div.
American Brake Shoe Co.
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(Plant: Melrose Park, Ill.)

Frank Foundries Corp.
2020 3rd Ave.
Moline, Ill.

Griffin Wheel Co.
445 N. Sacramento Blvd.
Chicago 12, Ill.

Wells Manufacturing Co.
7800 N. Austin Avenue
Skokie, Ill.

Eagle Iron Works
129 Holcomb St.
Des Moines, Ia.

Helmick Fdry.-Mach. Co.
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Fairmont, W. Va.

Carondelet Foundry Co.
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Keller Foundry Co.
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Knoxville, Tenn.

Arkansas Foundry Co.
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Little Rock, Ark.

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75 Horton St.
Seattle 4, Wash.

Union Iron Works
Box 2135
Spokane 2, Wash.

Caird Engineering Works
Helena St. & Montana Ave.
Helena, Montana

Pacific Ball Mfg. Co.
P. O. 106
Southgate, Calif.

Pacific Foundry Co., Ltd.
3100 19th St.
San Francisco, Calif.

Stanley Foundries
6009 Santa Fe Ave.
Huntington Park, Calif.

Capitol Foundry Co.
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Darbyshire Steel Co., Inc.
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Use NI-HARD* GRINDING BALLS

Above—Ni-Hard balls being packed in drums for shipment to cement plants, from the Pennebacker Company.

Right—Pennebacker 1" diameter Ni-Hard balls sectioned to show soundness.

NI-HARD has amply proven its worth as grinding ball material in the cement industry. In dry grinding raw stone and clinker, balls of this highly abrasion-resistant metal have shown a superiority over hardened steel of up to 5:1. . . . They have given 50% longer life than hardened steel in wet grinding cement stone.

Ni-Hard balls are immediately available from Pennebacker stock in ½", ⅝", ¾", ⅞", 1", 1½", 2" diameters. Also Ni-Hard slugs are produced in the following sizes: ⅝" diam. x 1¼" long, ⅞" and 1", and 1" x 1¼".

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*Reg. U. S. Pat. Off., The International Nickel Co., Inc.

THE PENNEBACKER COMPANY

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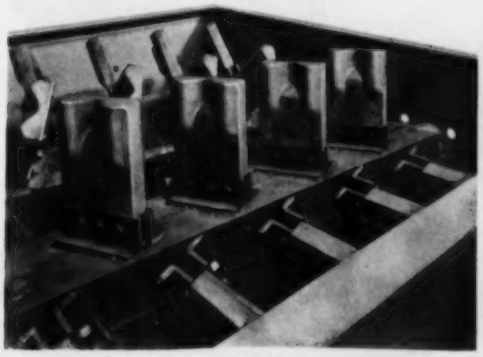
Authorized Producer of Ni-Hard

NI-HARD* CASTINGS

ARE PUT TO THE SUPREME TEST

IN EAGLE LOG WASHERS



AND THEY COME THROUGH WITH LOWERED MAINTENANCE COSTS!

The only difference between washing gravel and holding metal to a grinding wheel is that the grinding wheel is more gentle. The paddles on a log washer take a terrific beating . . . abrading and churning through gravel, crushed stone and metallic ores, ton upon ton, day after day. To be commercially practical the metal used for these paddle shoes must withstand abusive wear and be reasonably priced. Ni-Hard—nickel alloyed cast iron—has met the challenge. It greatly outlasts semi-steel, chilled iron and other metals tried. Readily replaceable.

Ni-Hard shoes, shown above, are bolted to blades on the revolving "log" or shafts of the Eagle Log Washer. The scouring action of the paddles plus wash water currents rising from the tub bottom provide positive removal of tough plastic clay balls, conglomerate and soft stone.

Eagle Iron Works modern, closely controlled foundry is licensed to produce Ni-Hard castings for use on Eagle equipment and for others requiring Ni-Hard castings.

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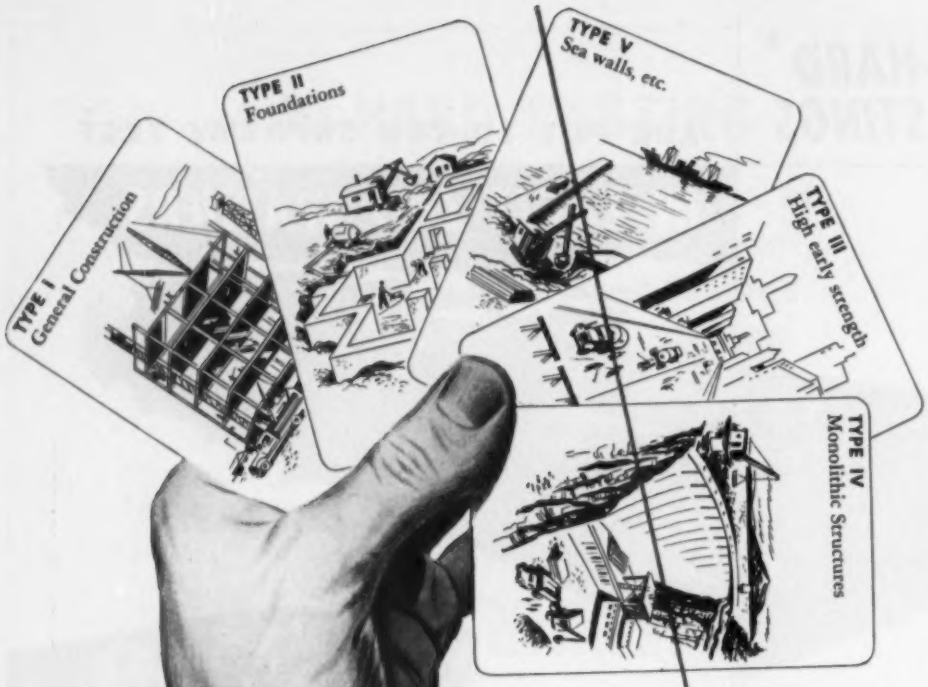

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BROADEN YOUR PRODUCTION
REVIVE YOUR QUARRY

Depending upon the composition of your "run-of-quarry" stone, the Flotation Process may enable you either to modify the analyses of the kiln feeds or to permit the practical substitution of other available components, and thus adjust the chemical ratios of your raw materials to broaden your production to include all five standard Types of cement (I-II-III-IV-V). It provides for the economical use of inferior limestones; materially lengthens the life of the quarry; and reduces costs by avoiding selective quarrying.

When properly integrated with the grinding and classification circuits, the Flotation Process usually involves a saving in power; and burning characteristics of the final compositions are improved. The total savings may more than offset the operating costs of flotation. The rejects of the process may be a saleable by-product.

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Each quarry involves special conditions, and special flow sheet requirements. Our laboratory and pilot plant are fully equipped to handle a thorough investigation of your materials. After this investigation, by mining and chemical engineers, trained in cement chemistry, we can design, equip, and supervise the erection of a complete raw-material plant, engineered to meet your individual requirements. Preliminary examinations are made without obligation on your part. Write us for detailed information.

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3-9

Agricultural Limestone Producers Hold Mid-Year Meeting at Chicago

SOME 150 directors and members of the National Agricultural Limestone Institute gathered at the Hotel Sheraton in Chicago last month to take part in their association's regular mid-year meeting. The three-day program featured addresses by Emil Truog, chairman

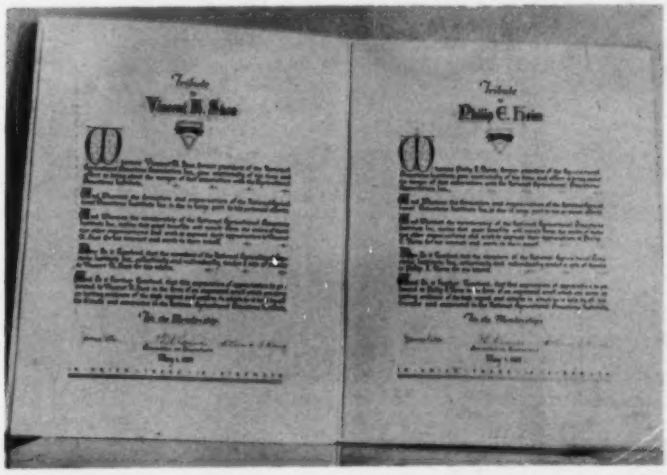
By WILLIAM M. AVERY

of the Department of Soils, University of Wisconsin, and former Congressman George H. Christopher, and included an excellent panel discussion of the Institute's activities in the important field of promotion.

The group's committee on percentage depletion urged all producers to file for the full 15 percent allowance. In discussing this recommendation, Executive Secretary Robert Koch pointed out that the law as passed is not wholly clear in its application to agricultural limestone producers, and he expressed the opinion that a court test is ultimately inevitable to determine whether the industry is entitled to a 5, 10 or 15 percent depletion allowance.

If the courts should disallow the 15 percent figure, Mr. Koch said, producers who file for that amount would have to make an additional payment, plus 6 percent interest, but he feels that there is a sound basis for believing that the industry is entitled to the maximum figure set up for chemical and metallurgical grades of limestone. The 15 percent figure, the speaker said, should be applied to gross income, but the allowance must not exceed 50 percent of net profit.

• At the head table during the mid-year banquet of N.A.L.I. were (left to right): K. K. Kinsey, Concrete Materials & Construction Company, Cedar Rapids, Iowa; Philip E. Heim, The Carbon Limestone Company, Lowellville, Ohio; Robert M. Patton, New York Coal Sales Company, Columbus, Ohio, president of N.A.L.I.; Robert M. Koch, executive secretary of the Institute; George H. Christopher, former congressman from Missouri; and William E. Stone, Piqua Stone Products Division, Armco Steel Corporation, Piqua, Ohio.



• These attractive scrolls have been presented to Philip E. Heim and Vincent H. Shea, presidents, respectively, of the Agricultural Limestone Institute and of the National Agricultural Limestone Association, in recognition of their unstinting efforts, culminating in the merger of the two organizations.

Mr. Koch pointed out that the law now applies to fiscal years following December 31, 1950, and that as a result of this provision some companies stand to lose as much as 11 months of the first year's depletion allowance. He added that a concerted effort is under way to amend the law so that it will apply to calendar years starting with January 1, 1951.

There was considerable discussion of the Institute's drive to enroll new members. Mr. Koch disclosed that 30 new members have signed up since the two associations (National Agricultural Limestone Association and Agricultural Limestone Institute) were consolidated last January, bringing total membership to 193. While this is a good showing, Mr. Koch said, there are still more than 800 producing companies which do not participate in N.A.L.I. He expressed the belief that total membership may be increased to around 300 by the end of 1952, and that further gains may be looked for in the years to come. The membership committee, Mr. Koch said, plans to continue circularizing the prospect list in order to keep non-members informed on the Institute's vigorous program, and on how it benefits the entire industry.

Institute President Robert Patton, in his brief report to the group, expressed the conviction that membership should comprise at least half of the approximately 1000 producers

• Clint A. Allen, executive secretary of the Iowa Agricultural Limestone Association, addresses the special session on promotional activities. In the foreground are reproductions of some of the billboard advertisements prepared by the Iowa group.

in the agricultural limestone industry. One means of approaching this goal, Mr. Patton said, would be for each present member to bring a non-member guest to the organization's next annual meeting in Washington, D. C.

Regarding future meetings, Mr. Patton disclosed that the 1953 convention will be held at the Hotel Statler in Washington on January 19, 20 and 21, during inaugural week. He also announced that the 1954 meeting will be held at Chicago in conjunction with the machinery exposition of the National Crushed Stone Association.

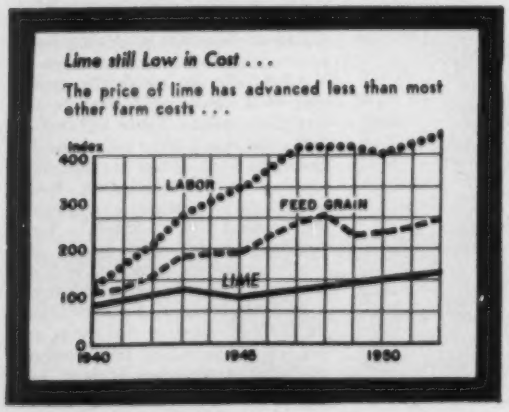
Liming Is A Basic Practice was the subject of Professor Truog's address. This speaker estimated that it would require between 500,000,000 and 1,000,000,000 tons of agricultural limestone to bring up to peak production all the land now under plow in the United States. Once this gigantic job had been done, peak production could probably be maintained by the application of 50,000,000 to 100,000,000 tons of agstone annually. These figures, Professor Truog said, are in sharp contrast to the present consumption rate of around 30,000,000 tons annually.

The speaker stated that liming is important for many reasons, and he listed the following: 1) to supply calcium and magnesium; 2) to neutralize soil acidity; 3) to make and keep phosphorous more available; 4) to promote nitrogen fixation; 5) to promote nitrification; 6) to promote build-up of organic matter; 7) to improve the physical condition of the soil; 8) to promote soil conservation 9) to promote the production of better feed and food.

Professor Truog used lantern slides to illustrate how plant growth is affected by various degrees of soil acidity and alkalinity. At pH 6.5, according to the speaker, all the necessary elements for plant growth are fully available, but sharp deviations to either side of this neutral point generally result in retarded or otherwise unsatisfactory growth.

Adequate liming, fertilizing, and other practices, according to Professor Truog, would support twice the present world population without materially increasing the total acreage under cultivation. He believes that we now have about as much land in production as we can economically use, and that only by increasing yields can we hope to provide for the more than 60,000 additional people who must be fed each day.

Mr. Christopher took a roundhouse swing at those who criticize farm subsidies, labeling their views as wholly unrealistic. He pointed out that our vast network of railroads could never have been created without the help of generous federal subsidies, and that even today it would be impossible for the airlines to operate without subsidies. He also reminded his audience that newspapers, magazines, and catalogues are delivered by the Post Office at about 10 percent of actual cost.



• One of the graphs in the Association's most recent promotional folder shows how little the price of agricultural limestone has increased in comparison with other farm costs.

• Mr. and Mrs. Paul Nauman, Dubuque Stone Products Company, Dubuque, Iowa.

Our present prosperity and high standard of living, Mr. Christopher believes, are largely a result of the fact that only 15 percent of our population is directly engaged in food production. Thus man-hours, energy, and native ingenuity have been released for other pursuits. Curtailment or elimination of the PMA and ACP programs, the speaker said, would be a step backward, since many farmers are still unable to do the things their farms urgently need.

Mr. Christopher views the agricultural limestone business as far more than just a routine venture for profit. He believes that it gives far-sighted men a prime opportunity to work for the future health and prosperity of the nation. He urged those present to take back to their jobs the knowledge that they are helping to preserve the United States for their children and their children's children.

Addressing the group after the mid-year banquet, Mr. Koch expressed the firm opinion that there will always be a conservation program, regardless of which political party is in power. He said that the present trend of population growth in this country indicates that by 1975 there will be 38,000,000 more people to feed, and that it would require an additional 100,000,000 acres of cropland to handle this added load at present yields. Since the acreage is not available, Mr. Koch said, the only possible solution is to increase yields, and the best means of accomplishing this is to do an adequate liming job. By meeting this challenge he believes we will strike a telling

• Lester Helgeson, Footville Lime & Rock Company, Footville, Wis., and Charles H. Duesing, special representative of the Atlas Powder Company, Chicago.

blow against Communism, which traditionally finds greatest acceptance among hungry people.

Mr. Koch used colored slides to indicate the increased amounts of various farm commodities which will be required by 1975. By that year as much additional beef will be required as is at present produced in Texas, Oklahoma, and Minnesota; as many more hogs as are now raised in Nebraska and Iowa; as many more sheep as are now produced in the states of Nevada, Utah, Wyoming, and Montana; and as much additional milk as now comes from Wisconsin, Michigan, and New York.

At the banquet session Mr. Patton made formal presentation of two attractive scrolls in tribute to Philip E. Heim and Vincent H. Shea, former presidents respectively of the Agricultural Limestone Institute and of the National Agricultural Limestone Association, for their untiring efforts in bringing about the long-sought merger of the two organizations.

The final session of the meeting was entirely given over to discussion of promotional activities. Director William Stone, chairman of the promotion and research committee, presided.

In opening the discussion Mr. Stone expressed the view that agricultural limestone should be sold from the standpoint of long-range conservation rather than just as a product to be marketed. Above all, he said, the consumer must be persuaded that the farm program is a vital necessity, and that only through conservation can this generation hope to leave a sound heritage for its children.

Mr. Stone distributed copies of a new folder recently completed by the promotion committee and available to institute members. The folder shows in several different ways that agstone is a better buy today than ever before. For example, 85 lb. of milk bought only 550 lb. of agstone in 1935; today the same quantity of milk buys 1,050 lb. of agstone. A graph shows that the price of agstone has advanced relatively little as compared with many other farm costs, and another comparison based on an actual test shows a 7:1 return on limestone employed in an oats-hay-hay-wheat-hay rotation over a 6-year period.

Mr. Stone explained that Institute members may purchase the folder at $17.50 per thousand without name imprint, or $20.00 per thousand with an imprint. He also expressed the committee's view that in the future extreme care should be *exercised* to avoid preparing too many costly promotional pieces.

At the suggestion of the meeting chairman, Clint Allen, executive secretary of the Iowa Agricultural Limestone Association, discussed his group's experience with billboard advertising. Iowa producers, according to Mr. Allen, have found billboards to be the most effective of several media — including radio, newspaper ads, and direct mail — which they have tried. He showed color samples of the current series of six posters for billboard displays, and explained that under ordinary conditions each poster may be expected to last 60 days.

Mr. Allen stressed the importance of contracting for billboard space for a year in advance, pointing out that this is the only way to assure a good location. The overall cost of billboard advertising runs slightly less than a dollar a day, Mr. Allen said, and once a program is launched, he believes it requires less attention and effort than most other forms of advertising. Mr. Allen said his organization would be glad to make the posters available to any Institute member at the same price which Iowa producers pay.

• Emil Truog, chairman of the Department of Soils, University of Wisconsin, whose address entitled, "Liming Is a Basic Practice", was one of the highlights of the meeting.

• William J. Stoffel, Dolese and Shepard Company, Chicago.

Also discussed at the session on promotional activities was a new service which the Institute is offering its members. For a charge of $2.00 per newspaper, members may arrange to have local publications receive a series of 48 publicity releases which will be prepared and mailed out from the Washington office of N.A.L.I.

Mr. Koch pointed out toward the close of the meeting that the National Grasslands Program in the various states provides an excellent opportunity for effective advertising. He suggested that groups of producers might provide awards at the county level. A set of three awards, consisting of a cup and two medals, can be provided at a cost of about $15. This was tried recently, Mr. Koch said, by a group of producers in Massachusetts, resulting in a good deal of favorable publicity for the industry and its product.

Lofstedt Views Brazilian Sites For 4,000 Bbl. per Day Plant

Carl J. Lofstedt, consulting engineer, formerly general operating manager for Penn-Dixie, recently completed a tour of inspection for Erle P. Halliburton and Cia. Brasiliera de Ligantes Hidraulicos. Mr. Halliburton and the Brazilian concern are contemplating the erection of a 4,000-bbl.-per-day cement plant at Macahe, Brazil.

The unique features of such a plant would be the pumping of a limestone slurry 72 kilometers from the deposit to the coast, and the installation of a hydroelectric plant to furnish power for the quarry, crushing, and preliminary raw-grinding departments.

WASHINGTON NEWS LETTER

By S. HERBERT UNTERBERGER

THE conflict between the Presidency and Congress has rarely reached the current high pitch. Under a constitutional system such as we have, which divides the authority to govern among the legislative, administrative and judicial branches, conflict over the extent of the authority of each branch is to be expected. A successful administration is one in which these conflicting interests accommodate themselves to each other with the minimum of friction. Generally, confidence is lost in an administration in which the conflict breaks out into open warfare.

In the current administration many of the differences between the Presidency and Congress have resulted from their widely differing economic predictions. The most dramatic example is found in the history of price control legislation.

It will be remembered that shortly after the beginning of the Korean conflict the President asked Congress for standby price control legislation. But he wanted a very weak form of legislation. From this fact it may be assumed that his prediction was that a serious inflation was very unlikely and that if inflation did come, it would come slowly enough that the controls could be strengthened if the need arose.

The prediction of Congress as to the imminence of inflation was quite different. Congress apparently believed that substantial inflation was imminent. It passed much stronger control legislation. It literally forced these powers on the President over his very strong protest.

In this case it turned out that Congress was right and the President was wrong. Very soon after he received the power to control prices and wages, he established so-called "stand-by" agencies; and it was not very long thereafter that they were converted into full-fledged agencies. Within seven months after the first battle in Korea the office of Economic Stablization (E S A), the Office of Price Stabilization (O P S), and the Wage Stabilization Board (W S B) were in business. Congress seemed to be able to guage the temper of the people far better than the Administration. Its members, remembering the shortages during World War II, seemed to feel that we were all going to go on a buying spree, thereby pushing prices up to unprecedented heights.

It was not too long before the President was complaining that the law did not give him enough power fully to control inflation. When the Economic Stabilization Act came up for extension, he asked for substantially extended powers.

Again Congress disagreed with him. Instead of tightening the controls, they loosened them somewhat. The principal method for accomplishing this was the so-called Capehart amendment. The Administration issued dire predictions about the substantial upsurge of inflationary forces.

Based on the "feel" of the situation, Congress decided to take the chance and adopted the amendment. Despite looser controls, inflation did not stop, but it slowed up considerably. For some unexplained reason the buying spree spent itself. Wage earners did not spend money as fast as they could get hold of it; instead, personal savings began to rise at an unprecedented rate. For the first time since the end of World War II it became easy to buy consumer durable goods such as televisions, refrigerators, and automobiles. As a matter of fact, prices on these items fell somewhat. Numberless items began to sell under their "ceiling".

As it turned out, the economic predictions of Congress appeared to be far more accurate than those of the Administration's economists.

The Economic Stabilization Act is up for renewal. Again Congress means to loosen up controls. Congressional pressure has already forced certain actions in that direction. The relaxation of down payment requirements on installment and real estate sales is a direct result of that pressure. The Administration continues to insist that inflation is in the wind. It holds to this position despite the fact that prices are rapidly softening in a wide variety of items, that unemployment has been increasing, and that whole industries such as textiles and shoes are in the economic doldrums.

Congress may be right this time, too. Indeed, many congressmen feel strongly that this is the time to abolish all anti-inflationary controls. However, because this is so much a political year, the judgment of Congress is tempered with caution. It fears that if an abolition of controls were followed by even a small spurt in prices, the Administration would make so much of the situation that it would get the upper hand politically. Since it does not want to take this chance, the obvious compromise will be to extend the controls but for a relatively short period of time. The real decision will be postponed for the next Congress.

The other major recent conflict between the President and Congress related, of course, to the differences over the handling of the labor dispute in the steel industry. Here the judicial branch had to be called in as an arbitrator. For the most part, around Washington, the decision of the Supreme Court was received with great relief. If the preference of the inhabitants of this city could be polled, it is likely that they would be found worried about who will win the forthcoming election; but even more they would like to see the same political and economic philosophy in Congress and the White House, so that at least for a while there will be an end to this constant bickering.

Building of Equipment Plant Urged by Israeli Government

The establishment of a plant to manufacture stone-crushing and quarry equipment in Israel has been recommended by the Israel Government Investment Center to "fill a most vital need in the country's industrial economy," it is reported in the current issue of *Economic Horizons*, monthly publication of the Jewish Agency's Economic Department in New York.

According to the project study, the investment required will amount to about $250,000, of which some $150,000 will have to be in foreign exchange.

Based on market requirements, the Investment Center estimates that up to 100 additional quarries are needed in Israel to fill the local demand. The equipment needed for existing and additional quarries warrants the establishment of a medium-sized plant for the manufacture of jaw crushers, rotary grinders, and rotary screens, as well as other quarry equipment, such as air separators and ball mills. The total projected production would amount to 1,200 tons of finished products per year for the first two years.

You Get Plus Performance with "EUCS"

(Above) Model TD Rear-Dump Euclid. 22 ton capacity . . . 14.8 cu. yds. struck . . . loaded top speed 32.4 m.p.h. . . . powered by 286 or 300 h.p. diesel engine.

(Below) Double-acting twin hoists and entire hydraulic system are of Euclid design and manufacture. Action is fast and positive enabling operator to control body position at all times.

REAR-DUMP EUCLIDS are engineered and built for lasting strength. Their ability to stay on the job, day after day and year after year, means more tons moved at lower cost . . . "plus" performance for owners.

"Euc" bodies have extra thick plates reinforced with heavy box section side and bottom supports. The rugged frames are built to withstand the impacts of hauling and dumping big loads . . . they're built to take the pounding and wear of loading earth, rock and other heavy excavation by large shovels and draglines.

Rear-Dump "Eucs" have many other "plus" features that make them standard equipment in mines, quarries and on construction work. For example, they have large capacity, ample power and traction for steep grades . . . speed on the haul road and full-floating, double reduction planetary type Euclid axle.

For information on equipment that is job proved on work similar to yours, get in touch with your Euclid Distributor or write direct for literature on the complete line of Euclid models.

The EUCLID ROAD MACHINERY Co., CLEVELAND 17, OHIO

EUCLIDS

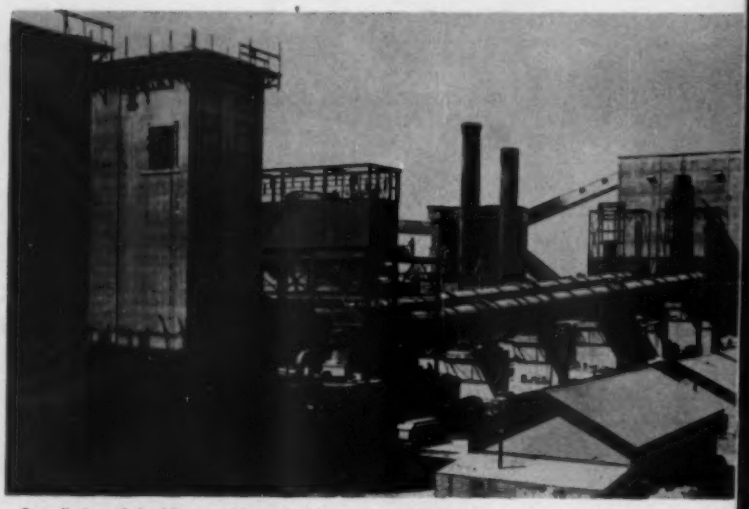
Giant Kilns to Boost Basic's Dolomite Processing 2,000 Tons Daily

TWO new rotary kilns, said to be the largest in the refractory industry (390 ft. in length; 11 ft. in diameter), are being erected at the Maple Grove, Ohio, plant of Basic Refractories Incorporated. These new kilns are part of the company's $3,500,000 expansion program at Maple Grove.

When in full operation, these kilns will "dead-burn" approximately 2,000 tons of dolomite daily and will expand Basic's annual production of granular dolomitic refractories by approximately 50 percent. This expanded capacity is required to meet the steel industry's increasing consumption of refractories.

Stone quarried by Basic at Maple Grove is almost chemically pure dolomite containing over 99 percent of the double carbonate of calcium and magnesium. A mill at the quarry site crushes, washes, and screens the quarried ore. Sizes of stone vary from 4½ in. to very fine. The ⅜-in. stone is fed by belt to the silo, which in turn mechanically portions the dolomite and supplemental raw materials to the kilns.

Completely assembled, the kilns will be on an incline 18 ft. higher at the feed end. In normal operation the kilns will be turned slowly at about ½ to 1½ r.p.m. The incline and rotary motion will impart travel to the dolomite mixture. Powdered coal will be fired into the kiln from the discharge end. As the mixture moves toward discharge, it will be progressively heated until, near discharge, it reaches temperatures in excess of 3,000 deg. F. This heating constitutes "dead-burning". After the heating, the mixture is cooled and conveyed to shipping platforms.



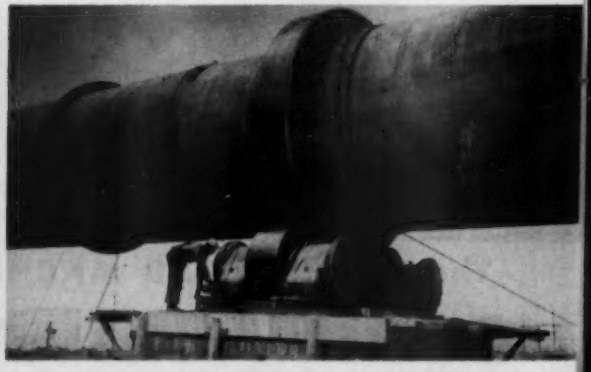
• Overall view of the kiln assembly at the Maple Grove (Ohio) plant of Basic Refractories.

Dead-burning effects chemical and physical changes in the dolomite mixture which then exhibits excellent refractory characteristics. Within the last 35 years, granular "dead-burned" dolomite has come to be the most important dolomitic refractory made in this country from the standpoint of both tonnage and value.

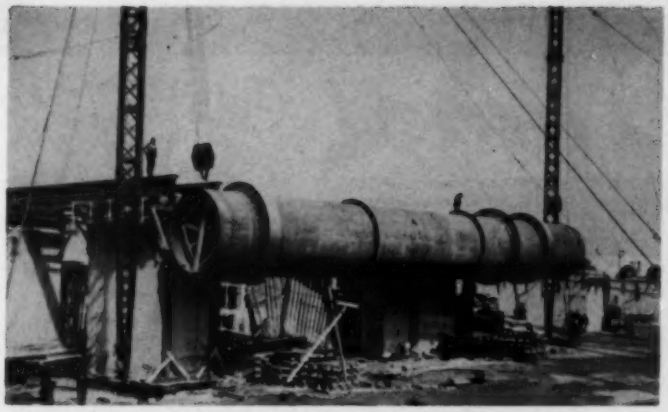
In addition to its production of dolomite at Maple Grove, Basic Refractories produces equally important magnesitic refractories at its Gabbs (Nevada) plant, which was recently expanded by the purchase of the Sierra Magnesite Co.

The kiln was designed and furnished by the Allis-Chalmers Manufacturing Company. The MacDonald Engineering Company is in charge of construction at Maple Grove. The Toledo Cartage Company was contracted by MacDonald to erect the kilns.

• A view of the kiln drive. The pinions have not yet been brought into mesh with the large kiln gear. The entire drive is on an adjustable base.



• One of the kiln tires on the rollers. Filler bars under the tires and the retainer rings are visible. Note that the joint of the two steel sections has been clipped. After the entire assembly is aligned, these joints are welded and the clips are removed. A re-inforcing ring is at the left.



• One of the kiln sections being hoisted into place.

Steel Shells Overall length of the kiln shell (assembled) is 390 ft.; the inside diameter of the steel shell is 11 ft. 3 in. The kilns were shipped in four sections. Lengths and weights of sections without riding rings (tires) were as follows: (1) 88 ft. ¼ in. long, approximate weight, 146,000 lb.; (2) 99 ft. 6¼ in. long, approximate weight, 144,000 lb.; (3) 100 ft. 7¼ in. long, approximate weight, 157,000 lb.; (4) 99 ft. 4¼ in. long, approximate weight, 152,000 lb. All shell courses are rolled one plate to the circle to form a true circular shell.

The steel is ⅞ in. thick except at those areas where the tires are welded, where it is 2 in. thick. These areas are 6 ft. 6 in. in length. Shell plate specification—A.S.T.M.-A-7.

The last 2 ft. 6 in. of kiln length at the firing end (discharge end) is made up of ⅞-in. stainless steel alloy plate and alloy steel castings forming the nose ring, which holds the brick lining at the kiln end. The alloy section and castings were furnished by Babcock & Wilcox Company.

Riding Rings The kiln shell rides on six cast-steel riding rings (tires) 172 in. outside diameter, 26 in. face width, 142¾ in. inside diameter. The tires are the floating type, of box section design, cast in one piece and heat treated. Between the inside diameter of the tire and the kiln shell there are 36 filler bars, 3 in. high, 6 in. wide, and 48 in. long, welded to the shell at alternate ends (to allow for the difference in expansion between the bars and the shell).

Riding rings are kept in place by 1½- by 3-in. retaining rings which are welded to the filler bars.

Reinforcing Rings In addition, the kiln shell will have 14 reinforcing rings, made of 2½- by 8-in. bar, the 8-in. side outstanding, welded to the outside.

Rollers The carrying mechanisms under each tire consist of two 54-in. diameter by 26-in. wide steel rollers, carried in 16-in. diameter solid forged steel shafts on bronzed lined bearings with oiling buckets. The bearings are water-cooled, and are carried in cast pedestals supported on a structural steel base. The roller pedestals are adjustable. The kiln is set on a slope of $\frac{9}{16}$ in. per foot and the feed end is 18 ft. 3⅛ in. above the discharge end.

Weight of the rotating part of the kiln, exclusive of brick, is 440 tons; the brick work weighs 490 tons; and the amount of material in the kiln at any one time is about 120 tons. The total weight rotating during normal operation is about 1,050 tons.

Kiln Drive The kiln is rotated by dual drive, consisting of two d.-c. motors, each driving a separate speed reducer through a V-belt drive. The low speed shaft of each reducer drives the pinion shaft through a flexible coupling. The pinions engage the main ring gear on the kiln shell and are meshed one-half pitch from each other in order to provide continuous driving force.

The motors are Allis-Chalmers 230-volt, d.c., variable-speed, 100/125 hp., 400/1,200 r.p.m.

The belt drives are also Allis-Chalmers and consist of a 16-in. pitch diameter sheave on the motor and a 32-in. pitch diameter sheave driving the high-speed shaft of the speed reducer, and nine size "D" V-belts. The speed reduction by the belt is 2/1. Jones Foundry and Machine Company furnished the speed reducers, which are double-reduction type with herringbone gears. The gear reduction is 31.41/1, size No. 490-DH. The total speed reduction from motor to kiln shell is 798.18/1.

The flexible coupling, between the speed reducer and pinion shaft, is a No. 240F Falk for 9-in. diameter shaft.

With motor operating at a maximum speed of 1,200 r.p.m., the kiln shell will rotate at 1.5 r.p.m. or 90 r.p.h. With the motor operating at 400 r.p.m., the shell will rotate at 0.5 r.p.m. or 30 r.p.h.

The auxiliary drive consists of one Allis-Chalmers gasoline engine with a Jones speed reducer and a jaw clutch for connecting it to the high speed shaft of one of the regular drive Jones reducers. The gasoline engine is capable of driving the kiln at a maximum speed of 7 r.p.h.

There is also a 15-kw a.-c. generator driven from the kiln drive; this supplies power for the operation of the Hardinge feeders which regulate the feed of raw materials to the kiln. The speed of the feeder motors is synchronized to the speed of the kiln.

Kiln Brick Lining The nose brick, at the discharge end of the kiln, is a 70 percent alumina brick and extends 2 ft. 6 in. into the kiln. Next, for an 8-ft. section, the kiln is lined with 80 percent alumina brick. The following 90-ft. section has Basic Burned Brick (Chrome-Magnesite); the next 90 ft. is lined with 70 percent alumina brick; and the remaining 199-ft. 6-in. length to the feed end of the kiln is lined with first quality fire brick.

Cooler The finished clinker is cooled on a Fuller Company grate-type cooler, 7 ft. wide by 44 ft. long. Air is blown through the grates and the clinker bed; and a part of the heated air is used for the combustion of coal, thus reclaiming in part the heat of the clinker discharged from the kiln.

Firing Equipment The Combustion Engineering Superheater Inc., Raymond Pulverizer Division, furnished the powdered-coal burning equipment, consisting of a No. 533 Raymond Bowl Mill with exhauster and an electronically controlled coal feeder for regulating the amount of coal fed to the mill. The coal grinding mill is driven by a 150-hp. motor and the exhauster by a 75-hp. motor.

Screenings

by William M. Avery

ACCORDING to a printed program which has just come into our hands, last month's 23rd annual summer meeting of the Concrete Products Association of Washington must have been a pretty exhausting affair. The following almost verbatim summary imparts a fairly accurate picture of the proceedings.

Friday, June 13: fishing, tennis, swimming, and boating. Oh yes, and a business meeting starting at 8:00 p. m., followed by dancing in the club house.

Saturday, June 14, the really heavy work started: golf, horseback riding, fishing, boating, swimming, cycling, tennis, and something-or-other called physio-hydro-therapy. For those not otherwise occupied, there was also a meeting at 11:00 a. m. At 6:30 p. m.: cocktail hour in the club house. Dinner at 7:30, followed by dancing in the club house.

Sunday, June 15: recreation! The program doesn't say, but we suppose that anyone who was too tuckered out for recreation at that point could have had another round of physio-hydro-therapy.

Viva Management!

A MAGAZINE called *The Foreman's Digest* has proposed that the President set aside one day each year as Management Day. If the idea is to try to preserve the species for a while, we find it hard to believe that a closed season of one day per year will do much good at this point. Fact is that the critters are so used to non-stop sniping it might just confuse 'em to declare an armistice once a year.

The *Digest's* editor says that theirs is the only organization actively promoting the idea, but, he adds hopefully, "we expect that others will soon enthusiastically join us". You know—enthusiastic chaps like Phil Murray, John L. Lewis and Walter Reuther.

Alas, Poor Unc

THE May issue of *Basic Blast* presents some pretty convincing evidence in support of the growing suspicion that Uncle Sam is overdue for a psychiatric checkup. Among other things, Unc now owns 848,567 typewriters (better than 3½ machines for every stenographer on the payroll), has enough paperclips on hand to last until the year 2030, and is the proud owner of a storage pile consisting of 2,340,000,000 eggs.

We're sure that many a private citizen has been certified as incompetent on grounds far less conclusive than these. A girl we used to know was locked up just because she was slightly wacky about waffles—had a trunk full of them in her room. Compared with Unc, she seems almost frighteningly sane.

Strictly Tepid

LOYAL readers of this department may have noticed that now and then we are not above dispensing honest-to- goodness information. Our yardstick for determining the suitability of informative items is brutally simple: the information must be enlightening but not provocative of any sort of sudden or violent action. In short, we don't want our readers to write to their Congressmen, tell why they like PIT AND QUARRY in 25 words or less, or start ripping the tops off cereal boxes like mad.

Take this, for example. 'Tother day we learned to our mild astonishment that in certain forms gypsum is used in toothpaste, window blinds, and dental work, and for brewing beer, making crayons, and grinding telescopic lenses. Even an advanced hyperthyroid can read copy of that general calibre without experiencing an irresistible urge to make some immediate use of his new-found knowledge. The reference to beer, of course, *might* start him off on a binge, but at least it would get him off to a slow start.

Piscatology

NEWS flash from the Larned, Kansas, *Tiller & Toiler*: "Harold Farney, who operates the sand and gravel pit southeast of the river bridge, caught a 5-pound bass in his own sand pit Wednesday". So

that Mrs. Farney will fully understand just what happened, we'd like to explain that the bass sunk its teeth into the sleeve of Harold's jacket while Harold was tightening up a dredge sleeve. Harold tried his best to shake him off, but the silly creature hung on until quitting time, so Harold figgered the fish was his.

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N.I.S.A. DISCUSSIONS COVER INDUSTRY'S MAJOR PROBLEMS

By WALTER E. TRAUFFER

another ON THE SPOT story!

THE National Industrial Sand Association held another of its well-attended and interesting meetings at The Homestead, Hot Springs, Va., on May 15, 16 and 17, 1952. While many of the old, familiar faces were missing, there were more new ones, setting a new attendance record and furnishing assurance that this association will continue to grow as one generation replaces another. There were few new subjects on the programs, but there were also many new angles on the old ones. As usual, the lighter side of the meeting was well planned. In addition to the usual men's and women's golf tournaments, a steak dinner was enjoyed at Trapper's Lodge on the mountain.

The subjects discussed at this three-day convention covered a wide range. Among them were the following: percentage depletion, wage and price controls, employee insurance and welfare plans, industrial health, industry research, car supply and condition, Association affairs, future plans, etc. The Association was reported to be in excellent financial condition. Plans for the fall meeting were also completed; it will be one most members will not want to miss. Probably the only dark spots in the picture were the potential threat of competitive synthetic materials now under experiment and the installation by some foundries of equipment for reclaiming used sand.

President's Address In his opening address on the first day of the meeting, President Sterling Farmer gave a brief review of developments affecting the industry. The bonded sand case, he said, has been settled in favor of the industry, and the outlook for the box car case is favorable, the Interstate Commerce Commission having recommended relief. He praised both committees for the work they had done.

Percentage depletion, Mr. Farmer declared, is still the most important development, and he gave full credit to all who had helped to bring it about. J. Rutledge Hill (Gifford-Hill Sand & Gravel Company, Dallas, Tex.) did the lion's share of the work from the industry standpoint, he said, and full credit must also be given to the firm of Covington & Burling, counsels for the Association, especially John T. Sapienza of that firm, and the Association's percentage depletion committee. He also praised the excellent work done in this case by Vincent P. Ahearn, executive secretary of the Association, and other members of its staff. Mr. Farmer paid tribute to the work accomplished by Theodore C. Waters, Association counsel, on industrial health matters and commented on his high standing among users of sand.

• New Officers of N.I.S.A. (left to right): Emery M. Durstine, treasurer; Cort M. Hardy, president; and Clarence R. Wolf, vice-president.

Ahearn's Address A highlight of these meetings is always Vincent Ahearn's review of the Washington scene, in both its serious and humorous aspects. He paid particular attention to the steel strike and predicted that the unions will win this strike and others which are sure to follow. He urged employers to make every effort to recapture the loyalty of employees, but to oppose any further increases in the power of the President or the government, even if it seems to be in favor of industry.

In other addresses Mr. Ahearn covered many subjects of importance. He said that percentage depletion has been obtained, but that it will also have to be defended in future years. Many congressmen, he warned, are against the entire principle involved; and the industry must be prepared to show that percentage depletion is in the public interest.

In discussing the present status of wage and salary regulations, Mr. Ahearn explained the limitations on what employers can do for workers on direct increases. He pointed out that there are other benefits permitted under the law, such as improved vacation arrangements; increased rates for Saturdays, Sundays, and holidays; pay for holidays not worked; and retirement, welfare,

• In this group are six ex-presidents of N.I.S.A., and at the far right is Vincent P. Ahearn, executive secretary. Left to right, top row: Sterling N. Farmer, A. Y. Gregory, George A. Thornton; bottom row: Cort M. Hardy, A. Warsaw, and Junius M. Strouss.

• Honored guests at the meeting were Mr. and Mrs. George F. Pettinos Sr.

and insurance plans, some of which may be obtained if applied for.

As an example of what can be done by companies too small to swing individual welfare plans, he described the National Ready Mixed Concrete Association's group plan, which is nearly ready. He indicated that getting up such a plan is a big job with many complications. After the many details of such a plan are worked out, articles of incorporation must be obtained, as well as the approval of several government bodies. He urged the Association to consider such a program as the trend is in that direction.

Mr. Ahearn stated that there has been little change in the 16-month-old General Ceiling Price Regulation and its application. At present there is no basis for hardship relief, but relief can be applied for under the Capehart Amendment if a company has lost money due to increased labor, material, and other costs. Up to the time of the convention, however, no industrial sand producer was known to have applied to OPS for such relief, and no sand-and-gravel producer was known to have obtained it.

As to the future of controls, Mr. Ahearn believes that both wage and price controls will not be extended after expiration March 1, 1953, as there is a growing feeling in Congress against it. The Building Materials Branch, he said, invited the nonmetallic minerals industries to have representatives at a conference on May 27 to discuss the subject of controls, including the passing on to the customer of increased transportation costs. In answer to questions, Mr. Ahearn gave much advice on procedures to be followed under existing regulations.

Walker's Report Stanton Walker, consulting engineer for the Association, gave a brief report on the convention of the American Foundrymen's Association, which a number of these present had also attended. He mentioned the possibility of N.I.S.A. being represented on the N.F.A. executive committee.

Mr. Walker said that the need for research by the Association or the industry is growing, and that the necessary arrangements for such work could be made with the University of Maryland, where the research department of the National Sand and Gravel Association is located. He mentioned some of the research which should be done and said that the space and most of the basic testing equipment needed are available. The prestige of the industry, he pointed out could be greatly enhanced at the cost of a few thousand dollars annually. A fellowship could be established at the university, or a graduate student could be hired. Some of those present felt that the many individual problems and those peculiar to certain producing areas would make a national laboratory impractical. Others felt that a central laboratory could handle general research, and each company could work out its own specific problems.

Election of Officers At this meeting new officers were elected for a two-year term. They are as follows: president, Cort M. Hardy (Hardy Sand Company, Evansville, Ind.); vice-president, Clarence R. Wolf (New Jersey Silica Sand Company, Millville, N. J.); treasurer, Emery M. Durstine (The Keener Sand & Clay Company, Columbus, Ohio). New directors are P. Grant Forman (Industrial Silica Corporation, Youngstown, Ohio); William J. Cannon, (Nugent Sand Company, Muskegon, Mich.); Gene M. Mason (Clayton Silica Company, Waterloo Iowa); and Marcus S. Wright Jr. (South River Sand Company, Old Bridge, N. J.). Carrying over as directors are Earl T. Andrews (Pennsylvania Glass Sand Co., Hancock, W. Va.) and P. W. Palmer (Browntown Silica Company, Browntown, Wis.). The last three past presidents acting as *ex-officio* members of the board are A. Y. Gregory (Whitehead Brothers Company, New York, N.Y.), George A. Thornton (Ottawa Silica Company, Ottawa, Ill.), and Sterling N. Farmer (Sand Products Corporation, Cleveland, Ohio).

Percentage Depletion The subject of percentage depletion for the industry received considerable attention at these meetings, and a round-table discussion on the subject was led by John T. Sapienza, Association counsel, who had much to do with obtaining this benefit for the industry. He discussed many of the problems which have arisen on the interpretation and application of the Revenue Act of 1951, or problems which might arise in the future. He particularly emphasized the importance of each producer having on hand a record

• Left to right: Lyle T. Manley, Sterling N. Farmer, C. Franklin Wolf, and Theodore C. Waters.

• Left to right: A. Warsaw, E. C. Sawyer, W. H. Woodward, Robert R. Cozey, and Russell Cronenweth.

• Some of the golfers, including Stanton Walker, Jesse T. Morie, Marcus Wright Jr., P. W. Palmer, Junius M. Strouss, and T. C. Waters.

• More golfers, left to right: Charles Gorsuch, Gene Mason, John Putnam, and Arthur P. Harrison.

of his economic interest in his deposit, to substantiate his tax claims. Many questions were asked and answered, and Mr. Sapienza also referred producers to the booklet on percentage depletion which was prepared under his direction for the N.S.G.A. and which was written for more general application for PIT AND QUARRY. (See PIT AND QUARRY, February, 1952, pp. 101-103 and 109.)

Industrial Health Theodore C. Waters in his annual report on industrial health stated that this subject is becoming more and more important; that more laws are being passed on it; and that the prospect of federal action must be recognized. The American public, said Mr. Waters, is aware of the high industrial toll in sickness, accidents, and deaths, and the labor unions are also putting pressure on industry for improved working conditions.

The year 1952, Mr. Waters pointed out, is an off year for state legislatures, but 43 states already have compensation laws for industrial disease. The trend also is toward the type of law which imposes on the employer the responsibility for all types of disease arising from employment. In Michigan a bill failed to pass which would have apportioned the risk among all carriers and previous employers. The courts, Mr. Waters stated, are tending to overlook the time limit on compensation, and in one case compensation was obtained 25 years after employment. In New York a bill failed which would have eliminated compensation for partial disability from pneumoconiosis, as there is no accepted means of determining partial disability. This incident is important, said Mr. Waters, as New York State has been a leader in thought along these lines.

Mr. Waters also briefly discussed the two bills recently introduced before the Senate which propose federal regulation of safety practices in industry. The Humphrey Bill, he revealed, would establish within the Department of Labor a Bureau of Accident Prevention which would have the authority to investigate conditions of employment, to develop safety standards, and to educate employers and employees in their application. Accident prevention boards for selected industries would be given broad subpoena, investigatory, and rule-making powers and would adopt industrial safety regulations. The bill provides that any violation of the proposed act shall be a criminal offense.

• A few more golfers, left to right: William J. Cannon, Walter E. Trauffer, and Gene Mason.

In discussing the Murray Bill, Mr. Waters stated that it proposes that Congress authorize funds to be distributed by the Secretary of Labor to states which have approved industrial safety plans. In order to be approved by the Secretary, these plans must meet several requirements. Neither bill, he said, can be passed at this session of Congress.

Mr. Waters also mentioned the proposed symposium to be held in September at the Saranac Laboratories, which will cover all the known medical, legal, and engineering information available on the entire subject of pneumoconiosis, including lung cancer. Mr. Waters will be co-sponsor of the symposium, which will attempt to evolve some pattern for the ultimate answer to the problem. He will head a panel on workmen's compensation on which labor, industry, and state health commissions will be represented. Earl Andrews will represent the industry. His knowledge of the practical side of this problem, in addition to the others, should be valuable.

According to Mr. Waters, insurance rates have been going down gradually during the last 10 years, but they will go up now with perhaps a 10 percent increase this year and another 10 percent in 1953. Among the reasons cited for this increase are the increased benefits being paid, the liberalization of some laws, and bad experience in some industries. He suggested that mem-

• Left to right: Mr. and Mrs. John T. Sapienza, Mr. and Mrs. Grant Forman, and Mr. and Mrs. A. Warsaw.

• Left to right: Clayton F. Devine, Ralph Lebold, and John Reading.

bers might reduce their insurance costs to some extent by allocating men to categories in which the rate is lowest.

After the conclusion of this address Mr. Ahearn pointed out that Mr. Waters was largely responsible for obtaining rate reductions for the silica sand industry. Pressure exists, he said, to eliminate the use of materials which have dangers, and it is to the best interests of the industry to eliminate any which still exist.

Freight Rates A complete report on freight rates affecting the industry was given by Emery M. Durstine, chairman of the traffic committee. He said that the matter of Ex Parte 175 had been finally decided, and that it permitted a general increase of 15 percent. This holds for all sand, except that in open-top cars the increase is 12 percent. He reviewed past conditions, when shipments in closed cars were penalized, and bonded molding sand in open cars took a higher rate than other sands. These injustices have since been remedied, said Mr. Durstine. The only case now pending is the closed car case, on which action should be taken soon. The Association claims that a 50-cent per ton extra charge for closed cars over the open car rate is unreasonable. A decision on this issue is expected within the next few months.

Mr. Durstine pointed out that taxes are an important factor in the freight rate picture as, in order to get a $281,000,000 net increase in operating revenue, the railroads must collect $675,000,000, or about 2½ times as much.

Railroad Cars No convention of this association would be complete without a thorough discussion of the condition of railroad cars. This year, however, a few producers reported themselves pleased with the condition of the cars they receive. They said that the practice of rejecting and sending back all the excessively bad or dirty cars has discouraged the railroads from sending them any but acceptable cars. One producer said that he contracts with a blasting and cleaning firm to clean out cars, and that the railroad pays the bill rather than send the cars back to their own cleaning plant 50 miles away. It was felt that if every producer turned down bad cars consistently, the problem would soon be solved.

Several companies reported spending large sums on cleaning and repairing the cars received, one setting the average cost at $10 per car. Grain in box cars was reported to be one of the most serious problems due to its tendency to contaminate the sand. Availability of gondola cars was said to be the worst problem. In some areas they are not hard to get if good condition is not a factor; but cars which will hold sand are in short supply. One producer reported that up to 25 tons of sand has been lost out of a car in transit, and that the railroad pays for this loss.

The railroads are blamed for the shortage of cars. They have been allocated enough steel for 50,000 new cars but are holding back orders because business has fallen off somewhat. On the other hand, the railroads are really trying to reduce turn-around time, and this effort, it is believed, has helped conditions considerably. Most of those present seemed not to be as much concerned over present car supplies as over what would happen if there were an upsurge in business.

Blast-Furnace Slag Output Sets New Records in 1951

A new record output of 29,327,434 short tons, valued at $36,307,693, was established by the iron blast-furnace slag industry in 1951. These statistics were compiled from a canvass conducted by the National Slag Association in cooperation with the U. S. Bureau of Mines. Included are the outputs of 43 companies operating 68 plants for processing air-cooled slag and from 16 plants expanding slag. Fourteen companies reported production of granulated slag.

Screened air-cooled slag, the major product, set a record high of 23,276,692 short tons, valued at $29,531,983—increases of 16 and 21 percent, respectively, as compared to 1950. Of this total, 21,076,059 short tons, or 91 percent, was used as railroad ballast, as aggregate in portland cement concrete, bituminous construction of all types, and in miscellaneous highway construction uses. Other principal uses for this type were in the manufacture of concrete block, mineral wool, and built-up roofing and roofing granules.

Marked increases were noted in the tonnage and value of unscreened air-cooled slag, which totaled 1,732,969 short tons, valued at $969,975—increases of 72 and 52 percent, respectively, over the 1950 figures. As in former years, approximately one-half of this material was used as aggregate in highway and airport construction.

Granulated slag increased 4 percent, amounting to 2,249,281 short tons, of which 53 percent was utilized as a raw material in the manufacture of hydraulic cement, 34 percent as road fill, and 7 percent as aggregate in concrete block.

The consumption of expanded slag in 1951 reached 2,068,492 short tons, valued at $4,917,091—gains of 21 and 31 percent, respectively, as compared to 1950. The bulk of this material was used in concrete block manufacture, a small percentage finding application as an aggregate in lightweight concrete.

Iron blast-furnace slag is produced in many states, but most of the material is processed in the steel centers of Ohio, Pennsylvania, Alabama, and Illinois.

S. Carl Smithwick Elected President Of New Expanded Shale Institute

MARKING the greatest single stride of the expanded shale industry during the third of a century of its existence, fourteen of the country's leading manufacturers met in St. Louis, Mo., on May 5 and 6 to form a national organization to be known as the Expanded Shale Institute.

Twelve states and Canada were represented at the conference by top officials of expanded shale plants using the rotary kiln process. They were invited to join the new organization, which includes companies in Texas, California, New York, Louisiana, Missouri, Kansas, Illinois, Virginia, Kentucky, Ohio, Tennessee, Oregon, and Toronto, Canada. Among those answering the roll call were H. H. Allen and George Bickel of the Featherlite Corporation, Dallas, Tex.; Ralph Rogers and Alex R. McVoy of Texas Industries, also of Dallas; William Thomas of the McNear Brick Company, San Rafael, Calif.; J. Murray Black of the John H. Black Company, Buffalo, N. Y.; A. R. Waters of the Carter-Waters Corporation, Kansas City, Mo.; W. W. Allen, L. S. Meyer, and W. W. Allen Jr. of the Hydraulic-Press Brick Company, St. Louis, Mo.; B. F. Park of Buildex, Inc., Ottawa, Kans.; William Poston and Frank Sedlak of the Poston Concrete Products Company, Springfield, Ill.; John Roberts of the Southern Lightweight Aggregates Corporation, Richmond, Va.; C. P. Hegan, Allan P. Taylor, and Philip Comstock of Kentucky Light Aggregates, Inc., Louisville, Ky.; C. H. Snyder and R. G. Martin of the Sunnyhill Aggregates Corporation, New Lexington, Ohio; George I. Greenup of the Lake City Lightweight Aggregates Corporation, Lake City, Tenn.; S. Carl Smithwick of Smithwick Concrete Products, Portland, Oreg.; W. Chester Smith of the Cooksville Company, Ltd., Toronto, Canada.

The following officers were elected, comprising the executive committee: S. Carl Smithwick, president; W. W. Allen, first vice-president; Alex R. McVoy, second vice-president; J. Murray Black, secretary; and A. R. Waters, treasurer.

An official of each member company, to be designated by the firm he represents, will be a member of the board of directors. A complete list of the board members will be announced in an ensuing issue.

It was the consensus among the manufacturers present that the pro-

First president of the newly-formed Expanded Shale Institute is S. Carl Smithwick, president of Smithwick Concrete Products, Portland, Oreg.

found interest displayed by members of building industry in the uses of this versatile material justified forming an association of this kind. Such an organization is not only highly desirable but vitally necessary if the industry is to keep pace with the demand for information concerning the uses and potentialities of expanded shale. Chicago was selected as the national headquarters of the Institute.

Briefly, the purposes of the Institute will be to improve and extend the uses of expanded shale concrete, including correlation of research and experimental work already accomplished and under way by other agencies; to perform original research; to do educational and promotional work with the entire construction industry, including architects, engineers, universities, and the general public; and to make available technical and general information by publishing literature covering the characteristics and many uses of expanded shale concrete.

Expanded shale whether used in block manufacture or in monolithic concrete, is said to be more versatile than any other aggregate now in existence. This is due primarily to its lightness, its excellent thermal, acoustical, and refractory qualities, its high structural strength, and its chemical inertness.

Confirmation of its versatility is seen in the variety of uses of the material, a partial list of which follows:

Lightweight concrete masonry units; piers and superstructures of bridges; tilt-up wall panels; multiple-story buildings; precast roof and floor slabs; precast bridge members, culverts, and guard rail posts; ships and barges; pre-stressed and post-stressed concrete; jet plane runways and aprons; refractory purposes; roofing tile, laundry trays and burial vaults; loose insulating fill; soilless plant culture; plaster and stucco aggregate.

For the first time in the long history of the expanded shale industry,

Head table: W. W. Allen, Alex R. McVoy, S. Carl Smithwick, J. Murray Black, and W. Chester Smith. Table at left, background: Frank Sedlak and William Poston; foreground: John Roberts, W. W. Allen Jr., and H. H. Allen. Table at right, clockwise, beginning at left: B. F. Park, George Bickel, William Thomas, Ralph Rogers, and L. S. Meyer.

Alex R. McVoy, second vice-president of the Expanded Shale Institute.

J. Murray Black, Buffalo, N. Y., named secretary of the new organization.

A. R. Walters, Kansas City, Mo., producer, was elected treasurer of E.S.I.

a single authoritative source of information will be provided to the member companies and to the entire building industry. The need for such a service is most obvious in the light of the tremendous increase in the extent and variety of its uses during the last decade, and with new and greater uses still in laboratory and experimental stages.

The new Expanded Shale Institute bears every promise of taking its place beside other great industrial associations whose purpose is to not only foster the growth and prosperity of their own industry but in doing so to furnish authoritative technical data so eagerly awaited by the engineering and architectural professions. Its progress toward this end will be watched with interest.

May Building Volume Sets Two All-Time Records

Expenditures for new construction rose to $2,750,000,000 in May, 1952, setting a new record for the month, according to a joint report of the U. S. Labor Department's Bureau of Labor Statistics and the Building Materials Division, U. S. Department of Commerce. During the first five months of 1952, total new construction outlays amounted to $11,900,000,000, 3 percent more than the total for the same period of last year.

Seasonal advances in most types of construction in May maintained total construction activity at a level moderately above a year ago. Expenditures for private residential building were about the same as in May, 1951, and factory building was still substantially above last year, despite recent declines. Most other types of private nonresidential building activity were below year-ago levels. Public utility construction showed a moderate increase over the year. Total private outlays for new construction amounted to $1,800,000,000 in May, bringing expenditures for the first five months of 1952 to $8,100,000,000.

Public spending for new construction continued its upward climb, reaching $947,000,000 in May. An increase in highway work, although less than usual for this time of year, was an important factor in boosting this total. Federal expenditures for military, atomic energy, and defense plant facilities rose more than seasonally. Total public outlays for new construction during the first five months of 1952 exceeded $3,800,000,000.

MORE TONS
PER MAN HOUR!
LONGER SERVICE
WITHOUT SHUTDOWNS!

when you use...

CLEVELAND
WIRE SCREENS

- Longer Productive Service
- Reduction of "Breaks" in Screen
- Toughness and Ductility
- Rigid Accuracy of Openings Maintained Continuously
- Built and Designed with Experienced "Know How"

Cleveland Vibrating Screen Sections are *tough*, but ductile . . . accurately woven of production-tempered abrasion-resistant steel. *Increase your tonnage, reduce down time*, by installing *longer-life* Cleveland Wire Screens!

Write today for Bulletin No. 6

THE CLEVELAND WIRE CLOTH & MFG. CO.
3576 E. 78th STREET · CLEVELAND 5, OHIO

personal mention

At a recent meeting of stockholders of the Lehigh Portland Cement Company several officers were elected to assume new positions. P. A. GROLL, who began his career with Lehigh in 1925 as a chemist, was elected vice-president and assistant operating manager. He became a vice-president of the company last year.

ARNOLD JOHNSON, formerly assistant operating manager, was elected assistant vice-president for operations. He has been associated with the company since 1929, and served as plant manager at Mason City, Iowa, for several years.

RALPH T. BROWNING, formerly assistant vice-president, was elected vice-president and general sales manager. Mr. Browning joined the Lehigh organization in 1937 as a clerk in the Allentown office.

R. O. ERDMAN, formerly purchasing agent, was elected vice-president in charge of purchases. His service with Lehigh dates from 1923.

WILLIAM W. FRAILEY, formerly insurance manager, was elected assistant treasurer of the company, assuming the duties of K. J. Schatzlein Sr., who was elected secretary last December.

G. W. Edwards

GEORGE W. EDWARDS has been named service manager of the Special Service Division of Basic Refractories Incorporated, Cleveland, Ohio, which was organized last year to assist steel producers with the construction of Ramset bottoms in open-hearth and electric furnaces. His duties will be primarily to supervise the planning and installation of Ramset bottoms. He has been with Basic since 1947, serving in sales capacities.

CHARLES R. HEILIG has been named senior sales engineer of Basic's central district—Ohio, Pennsylvania, Kentucky and West Virginia. Mr. Heilig joined Basic in 1944.

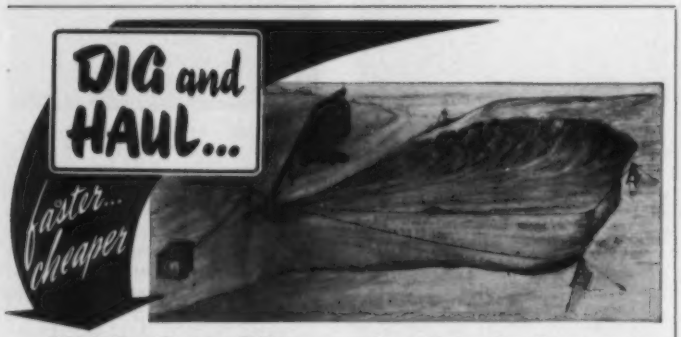
EDWARD J. NUNAN New York (state) sales manager and materials engineer of the Buffalo Slag Company Inc., the Federal Crushed Stone Corporation, and the Hornell Gravel Corporation, with offices in Buffalo, N. Y., has been elected president of the New York State Society of Professional Engineers.

R. F. GOODRICH, who was formerly in charge of the sale of agricultural limestone for the Franklin Limestone Company, Nashville, Tenn., has been promoted to the post of sales manager of the firm. He has been affiliated with the firm since 1928.

WILLIAM HEWITT, general sales manager of the East St. Louis Stone Company, East St. Louis, Ill., was recently elected president of the Illinois Federation of Sportsmen's Clubs.

ROBERT B. GARMAN, vice-president and general manager of the Tyrone Lime and Stone Company, Tyrone, Pa., was recently elected president of the Tyrone Chamber of Commerce.

HARRY E. TERRY JR. has been appointed Cleveland Division sales manager for the Medusa Portland Cement Company, with headquarters at 1000 Midland Building, Cleveland.



With One Man

Above—Sauerman Drag Scraper cuts deep into hill and moves gravel to crusher

SAUERMAN SCRAPER

Old waste pile of rock covering 12 acres is reclaimed and delivered to crusher by small Sauerman Scraper driven by 30 h.p. motor.

Here is a Sauerman Crescent scoop equipped with a trolley carrier for a track cable scraper installation. This type of installation, with the head end elevated considerably above the tail end, permits gravity return of the empty scoop from dumping point to digging point.

Why complicate what should be—and can be—a simple job? All you need to move material quicker, at lower cost, is a Sauerman Scraper machine—the heart of which is the unique Crescent scoop. The patented design of this bottomless "bucket" permits faster loading to capacity . . . smooth travel of load across the ground . . . clean, automatic dumping at discharge point.

One easily trained man can handle the entire operation as well as the small amount of maintenance required. First cost of a Sauerman Drag Scraper is moderate and Diesel, gasoline or electric power consumption is light, considering the tonnages handled.

Sauerman Engineers are always ready to consider your particular digging or stockpiling problem — to give you the most practical and economical solution to this problem.

Write today for free, illustrated booklet

SAUERMAN BROS., Inc.
534 SO. CLINTON ST. CHICAGO, ILLINOIS
Power Scrapers & Cableways
SINCE 1909

new machinery and supplies

● Tractor-Scraper

Commercial models of the 2C500 "Heiliner" scraper are now available for civilian users. Previous units have been built exclusively for military use.

The machine has a 13-cu. yd. scraper which is drawn by the tractor unit at speeds up to 25 m.p.h. loaded. Power is supplied by a Model HRB600 Cummins diesel engine delivering 165 hp. Air brakes on the tractor and scraper are synchronized and of the heavy-duty 2-shoe type.

A larger model, the 2C800, has a 200-hp. Cummins engine and an 18-cu. yd. scraper or a 20-cu. yd. dump wagon. They are products of the Heil Company, Milwaukee 1, Wis.

● Steel Strap Dispenser

Companies using quantities of heavy-duty steel strap will be interested in a new dispenser that handles ribbon-wound strap in ¾-, 1¼-, and 2-in. widths. The holder feeds strapping at the rate of 6 to 10 ft. per second. A pushbutton controls the feed motor, which operates through a Dodge speed reducer and is equipped with a Stearns magnetic disc brake. Signode Steel Strapping Company, 2600 N. Western ave., Chicago 47, Ill., is the manufacturer.

● Correction

Denver Equipment Company sent out a news release (PIT AND QUARRY, April, p. 127) which erroneously stated that "Denver Equipment Company had acquired manufacturing and sales rights to the Automatic Sampler formerly known as the GECO Sampler produced by the Heginbotham Equipment Co."

This announcement should have read: "—acquired exclusive manufacturing and sales rights to the Automatic Sampler formerly known as the DECO SL Sampler produced by the Heginbotham Equipment Co. of Salt Lake City".

EVANSTEEL

Super Strength Parts are "tops" for resisting SHOCK • WEAR • ABRASION • BREAKAGE

← EVANSTEEL Heat-Treated Hammers have proved far superior to any other material for pulverizing purposes.

EVANSTEEL Dipper Teeth give extra long service even in digging the toughest material. →

EVANSTEEL Pug Mill Knives are highly wear resistant, yet not brittle. ←

EVANSTEEL Wire Rope Sockets have had no recorded service failure in 40 years. →

For high-strength parts . . . for an *extra* margin of safety . . . for weight-saving sections . . . use dependable EVANSTEEL. This chrome-nickel alloy has a tensile strength after annealing that averages up to 60% greater than ordinary carbon steel.

Write for EVANSTEEL Bulletin

CHICAGO STEEL FOUNDRY CO.

Kedzie Ave. & 37th St., Chicago 32, Ill.

Makers of Alloy Steel for Over 40 Years

The Wyandotte Portland Cement Co. uses these Dustube Collectors for complete dust control at its bagging machines and bulk cement scales.

HOW TO CONTROL DUST WITH VIRTUALLY 100% EFFICIENCY

High collecting efficiency—virtually 100%—on even the most difficult dust and fume control problems is the number one reason for the acceptance of the Dustube Collector by the rock products industry. These cloth-tube type collectors are so efficient that the discharged air contains no visible solids—especially desirable for operations in residential areas.

Any dry dust, regardless of particle size or concentration, even hot and/or corrosive gases, can be handled with the same collection efficiency. And the material collected can be reused without further operations.

Not to be overlooked in selecting a dust control system, however, is the simplicity of design of the Dustube Collector that reduces the high operating and maintenance costs often encountered with other methods. There are many other advantages also. But why not write us for more information and free catalog.

GET YOUR COPY OF THIS CATALOG

If you have a dust problem this catalog on the highly efficient Dustube Collector may help you with the practical solution.

American WHEELABRATOR & EQUIPMENT CORP.

dustube COLLECTORS

430 S. Byrkit St., Mishawaka, Ind.

● Protective Goggles

A line of protective goggles has been introduced by the Fendall Company, 4631 N. Western avenue, Chicago 25, Ill.

These goggles are of the cup-type with each cup individually molded to conform

to both right and left areas of the face. Slots and perforations in the side piece and around the lens provide circulation and prevent fogging. Other features include adjustable headband, pressure-free fit, screw-type lens ring for easy changing of lenses, and a range of protective lenses for conditions involving chipping, welding, dust, and splashing.

● Tipped Drill Steel

The Rock Bit Sales and Service Company, Philadelphia 25, Pa. has added a 4-point carbide-tipped drill steel to its line of "Intra-Set" products.

These steels are made in 1⅛- to 2¼-in. gauge sizes and in lengths to 12 ft., with shanks to fit any hammer. They

have four-point chisel-type carbide-tipped bit ends.

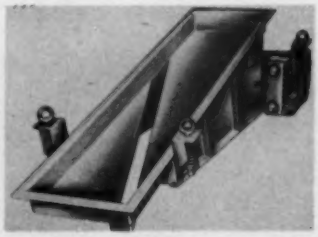
It is claimed that these steels drill rapidly with reduced gauge loss, and with less sharpening.

● Spreader Feeder

A vibrating spreader feeder for providing a continuous curtain of bulk materials such as roofing granules has been announced by the Syntron Company, 385 Lexington avenue, Homer City, Pa.

The spreader feeder is a flat pan trough with a diagonal slot that distributes the material in a steady flow along the edge of the slot. An electro-magnet provides the vibration for operating the feeder. The rate of feed is controllable

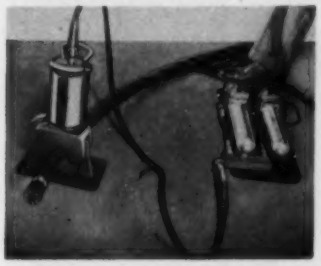
The spreader feeder is available in several sizes and capacities with either above or below mounting of the drive mechanism.



● Wire Rope Cutter

A latch-type wire rope cutter has been developed by the Manco Manufacturing Company, Bradley, Ill., to supplement its line of guillotine metal cutting equipment.

The cutter is operated by lifting the latch which opens the anvil. The rope is laid in position and the main body is



raised back to vertical and automatically locked in position.

Cutting is done by heavy-duty shear-type blades which are easily removed for sharpening. The frame is high-tenaile steel. The hydraulic piston and pump exert up to 50 tons' thrust, which will make a clean cut through 1¾-in. wire rope. Several types of pump assemblies may be used with the cutter, including foot power, electric, and remote control types.

● Protective Coatings

Neoprene coatings for protection from abrasion, corrosion, and other conditions is being marketed by the Crichton Company, Equipment Division, 1006 U. S. National Bank Building, Johnstown, Pa.

These compounds are made from neoprene, which is known for resistance to aging, chemicals, oils, and abrasion. They are available in several compounds covering a wide variety of applications from liquids for dipping or brushing on such items as pump impellers, casings, fittings, conveyor belting, pulley lagging, cable splices, fans and ducts, washers, and for general corrosion prevention of structures.

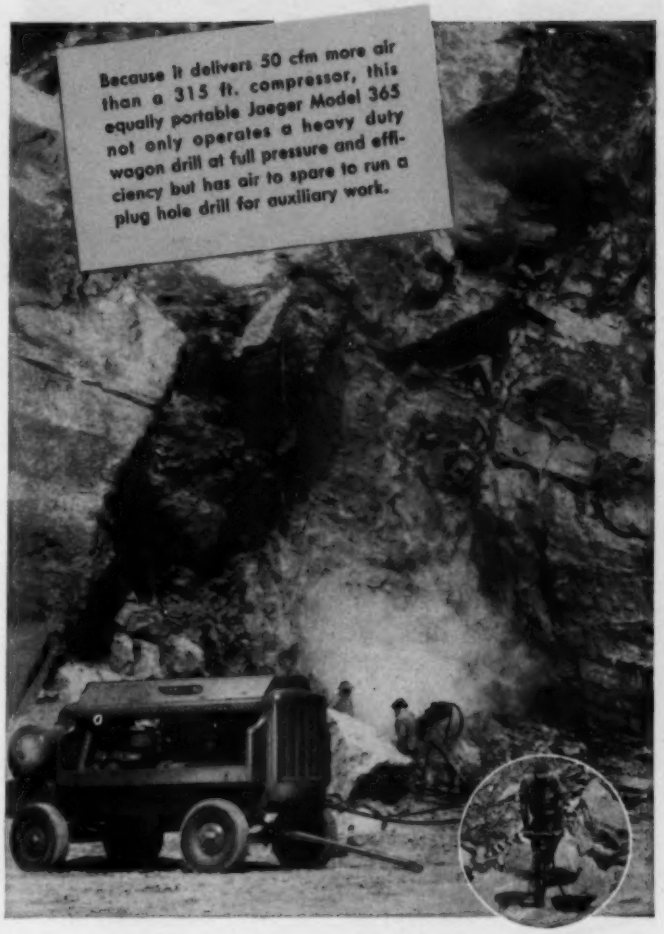
The material is put out in several types ranging from sheets for lining large surfaces to liquids for brushing, spraying, or dipping applications. A special type is made for skid-proofing floors. Heat-curing or air-curing types are being marketed to cover a wide variety of uses. It is claimed that use of neoprene will greatly extend the life of items subjected to rugged operating conditions.

● pH Meter

A laboratory pH meter for general use that is rugged enough for plant and portable applications has been announced by the Cambridge Instrument Company, 3732 Grand Central Terminal, New York 17, N. Y.

The meter is useful for small as well as large samples. It operates from standard 110-volt current and employs a bulb-type glass electrode for making the determinations which are amplified by an electronic circuit. Accuracy is said to be .05 pH with readings of .01 pH.

Jaeger "air plus" means 15% to 25% more air from portable compressors


Because it delivers 50 cfm more air than a 315 ft. compressor, this equally portable Jaeger Model 365 not only operates a heavy duty wagon drill at full pressure and efficiency but has air to spare to run a plug hole drill for auxiliary work.

As compact and portable as compressors of much less capacity, Jaeger Air Plus units produce, at the rock face, the air you need to operate your drills at full efficiency. Model 250 fully powers 2 heavy rock drills. Model 365 fully powers 3 heavy rock drills or one heavy wagon drill plus a plug hole drill. Model 600, introduced by Jaeger, was the first to run 2 heavy wagon drills efficiently. For increased production with low cost air power, see your Jaeger distributor or send for Catalog JC-1.

THE JAEGER MACHINE COMPANY

602 Dublin Ave., Columbus 16, Ohio

PUMPS • MIXERS • AGGREGATE SPREADERS • CONCRETE SPREADERS, FINISHERS

HEWITT-ROBINS

BIG, FAST AND SMOOTH

Scalps 4½-Ton Boulders without Shaking the Floor

You can fast-scalp 9,000-pound boulders at the rate of 1,100 tons an hour without any danger of floor vibration with a Hewitt-Robins Heavy-Duty Scalper.

For this big, rugged vibrating scalper is so designed to dampen vibration from the live frame that you can balance a nickel on the base while the unit is in full operation.

Secret of this smooth performance is the set of vibration-absorbing coil springs at the corners on which the live frame is mounted.

Think of all the many advantages that a Hewitt-Robins Heavy-Duty Scalper can offer you . . . fast, continuous flow of material . . . vibration-free operation . . . minimum maintenance requirements . . . maximum production.

Get all the facts about the Hewitt-Robins Heavy-Duty Scalper. Write for Bulletin No. 131 today.

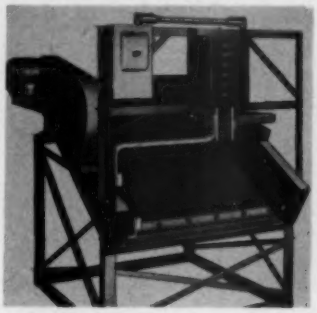
HEWITT-ROBINS HR INCORPORATED
STAMFORD CONNECTICUT

Hewitt Rubber Division
Hewitt Rexfoam® Division
Robins Conveyors Division
Robins Engineers Division

● Electric Screen Heater

An electric heater for screen cloths to prevent blinding (moist particles adhering to the wire) has been announced by the Deister Concentrator Company, 901 Glasgow Avenue, Fort Wayne, Ind.

The "FlexElex" screen uses a low-



voltage, high-amperage current to cause a mild heat in the screen wire, which dries material that would normally stick to it. The drying action is only enough to prevent the moisture on the edge of the particles from forming a bond with the metal; it does not materially reduce the moisture content of the material.

The FlexElex is recommended for use on the Leahy screens made by the company. On new equipment the heating device is incorporated at the factory. On older Leahy screens a conversion kit is available which makes field conversion a relatively easy matter. The installation of the heater does not increase the work of changing screen cloths except for disconnecting the flexible lead cables.

It is claimed that the use of the screen heater will eliminate the need for a beater to keep screens open and that the cloth will wear longer as a result. These savings are said to cover the cost and operation of the heater in many cases.

● Troughing Rolls

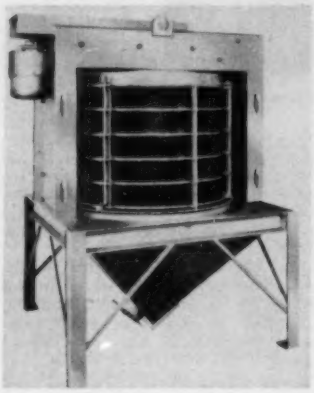
A heavy-duty, grease-type troughing roll assembly for belt conveyors has been developed by the Universal Engineering Corporation, Cedar Rapids, Iowa.

The new assembly features simplified greasing from one side, with flexible tubing conducting the lubricant to the farther bearings. Mounting brackets are self-cleaning and prevent build-up of material from reaching the Timken bearings or the rolls. Guard shields give additional protection to the extreme end bearings. These rolls are available in 5- and 6-in. diameters.

● Vertical Screen

A vertical screen for wet or dry separation of materials from 4-mesh down has been introduced by the Nordberg Manufacturing Company, Milwaukee 1, Wis., under the name of the "Symons V" screen.

The V screen is cylindrical and mounted vertically. Material to be processed is fed through an opening on to a



cupped feed plate with radial vanes which throw it against the cylindrical screen. As the screen revolves, it also gyrates, so that the material is allowed to drop a short distance before meeting the screen again. As this is repeated, the fine material passes through the openings in the screen and into the discharge hopper, while the oversize works down and out the bottom of the screen cylinder. The entire unit is completely enclosed and may be fitted with water sprays for wet applications. Discharge is arranged to suit the material being handled.

It is said that this screen is able to handle difficult material and to increase capacity by using centrifugal force that is equal to five times the force of gravity.

● Twist Drillbit

The New England Carbide Tool Company, 60 Brookline street, Cambridge, Mass., has announced a carbide-tipped drill bit that incorporates two spiral vanes in the body. These vanes pick up

the dust and remove it, so that packing or binding of the bit is prevented. It is claimed that these bits will function in such diverse materials as green concrete or granite, and that they are especially useful in drilling hard materials. Sizes range from 3/16 to 1¼ in. in diameter and from 3 to 24 in. in length, with larger sizes available on special order. The bits are designed for use in electric or pneumatic hammers.

American HAMMERMILLS OFFER...
"ACS Series"
Made in 4 sizes and two types. Capacity to 250 T. P. H.
Front Feed — For minimum of fines.
Center Feed — For maximum of fines. (Illustrated at left)
...A Size for Every Tonnage
"30 Series"
Made in 4 sizes. Capacity up to 100 T.P.H.
...from Roadstone to Agstone
"24 Series"
Made in 4 sizes. Capacity up to 30 T. P. H.
Write for Bulletin—"Better Stone Crushing"
American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers
1059 MACKLIND
ST. LOUIS 10, MO.

trade notes

The Magnaflux Corporation, 5900 Northwest Highway, Chicago 31, Ill., has announced that additional services have been added to its line of non-destructive testing by means of sonics and electronics.

The company now has laboratories in 11 major cities for all types of testing and has added a field inspection service to cover large objects incapable of being brought to the laboratories. The company still manufactures and sells various type of testing equipment for commercial use.

Jessel S. Whyte

Jessel S. Whyte, president of the Macwhyte Company, Kenosha, Wis., died on May 28 at his home following a prolonged illness.

Mr. Whyte, who was 61, became president of the wire rope company in 1937 after having served in many capacities from his start with the firm in 1905. He was familiar with all phases of wire rope manufacture, having been in the production, sales, and management departments. He broadened his knowledge of metals and wire by graduate studies in England and Scotland.

In addition to his activities in the Macwhyte Company, he was a director of the First Kenosha National Bank and the American Hoist and Derrick Company. He was also active in civic and philanthropic enterprises in the city.

W. J. Mohr has been named assistant export manager for Lippman Engineering International, Chicago 1, Ill. He will spend considerable time in South America promoting sales of crushers, portable plants, and similar machinery.

Mr. Mohr has been employed in South America for many years by such firms as Bucyrus-Erie and the American Brakeshoe Company.

The H & L Tooth Co., Montebello, Calif., has appointed Rock Drillers Supply Co., Philadelphia, Pa., as its distributor for the quarrying industry in the eastern Pennsylvania area.

The firm will sell and service the H & L line of forged, alloy-steel teeth which are secured to the bucket-lip adapters by positive-locking flex pins.

Francis P. Gary, 63, partner in the firm of L. V. Fraley & F. P. Gary, of St. Louis, Mo., engineers and equipment distributors, died in St. Louis, Mo., on March 16 after a brief illness. He came to St. Louis in 1933 and joined L. V. Fraley in forming the firm, which deals in construction and mining equipment throughout the St. Louis district.

The appointment of Walter J. Wilks as manager of the Chase Bag Company's Chagrin Falls, Ohio, paper mill has been announced. Mr. Wilks has been plant superintendent at Chagrin Falls since shortly after World War II. In his new duties, he will be in complete charge of all operations at the plant.

Succeeding as superintendent will be Harry S. Pedley, assistant superintendent under Mr. Wilks.

For Toughest Fine Mesh Screening of Damp LIME, AG-LIME and SILICA SAND

FlexElex Alone Offers this Double Advantage

FlexElex electric heating of screen cloth prevents damp fines from building up on the wire mesh. By eliminating this troublesome "glazing over", or blinding tendency, the screen is kept wide open for full capacity production.

However, heating is not the entire answer. Leahy Differential Vibration of the screen jacket snaps wedging, intermediate size particles loose at the rate of 1600 times per minute.

Only Leahy thus provides elimination of both major causes of blinding. Thoroughly field proved in the most tough and discriminating fine mesh screening of damp and plastic clays and shales, the Leahy offers an efficiency unmatched for economy and profit potential. Send for Bulletin 15-J.

The DEISTER CONCENTRATOR COMPANY

The Original Deister Company, Inc. 1906

911 Glasgow Avenue, Fort Wayne, Indiana

Bob Fletcher

Promotion of Bob Fletcher to eastern parts and service manager has been announced by the Hyster Company, Portland, Oreg.

Mr. Fletcher has been with Hyster Company for over 11 years, working in the machine shop, purchasing department, and parts and service department. In 1951 he was appointed district representative in the Tractor Equipment Division.

T. A. Jones

At a recent meeting of the board of directors, Thomas A. Jones was elected president of the W. A. Jones Foundry & Machine Co. of Chicago.

At the same time Frederick H. Hoge became chairman of the board. Robert B. Moir is now vice-president in charge of engineering, Joseph A. Marland is vice-president and manager of sales and service, James B. Christerson is vice-president and treasurer, and Robert E. Whiteway is secretary and production manager.

M. E. Wheeler

Announcement of the appointment of M. E. Wheeler as district sales manager of the Schield Bantam Company, Waverly, Iowa, was made recently.

Formerly with Schramm, Inc., manufacturers of air compressors and pneumatic tools, he was a district representative in seven Midwestern states.

The Manufacturers Division of the American Mining Congress, in their annual meeting at Cincinnati, Ohio, elected as its new chairman John P. Courtright, president and general manager of Marion Power Shovel Company, Marion, Ohio.

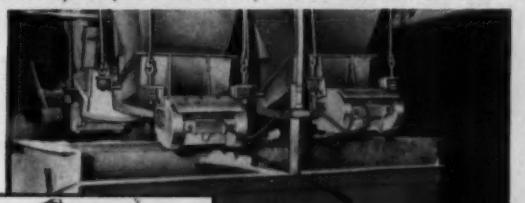
Mr. Courtright also was re-elected to the division's board of governors for a three-year period.

James E. Edelbrock has been appointed manager of the Chicago factory branch of Gar Wood Industries, according to a recent announcement. He replaces Ross Miller, who has assumed the position of vice-president and general manager of National Lift Company, Waukesha, Wis., a subsidiary of Gar Wood Industries.

Economical Feeding of Bulk Materials, Easiest Control of Rate of Feed *with*

SYNTRON VIBRATORY FEEDERS

Increase capacity and efficiency of coolers, driers, crushers, etc.



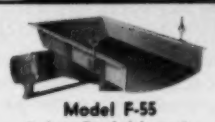
FEEDING LIME

Model F-22
Below Deck Magnet

Four Syntron Light Tonnage Feeders, with capacities up to 25 tons per hour discharge lime at the desired per tonnage rate into a four-compartment hopper in a vertical kiln lime plant.

SYNTRON
VIBRATORY FEEDERS

FEEDING GRAVEL



Model F-55
Below Deck Magnet

One Syntron Heavy Tonnage Feeder feeds sand and gravel, at a controlled rate of feed, into a conveyer system supplying the batching bins in a ready-mixed concrete batching plant.

SYNTRON
VIBRATORY FEEDERS

FEEDING DAMP SAND

Model F-44
Overhead Magnet

Two Syntron Heavy-Duty Overhead Magnet Feeders, with capacities up to 100 tons per hour, feed damp sand and rock fines in the blending of asphalt paving materials in an asphalt plant.

Write For Illustrated Catalog Literature

SYNTRON CO.

385 Lexington Ave.
Homer City, Penna.

J-M Industrial Friction Materials are the No. 1 choice of most leading manufacturers of earth-moving equipment

Friction materials are so vital to smooth and satisfactory machine performance that most manufacturers choose them with utmost care.

They look for the *correct* combination of operating characteristics and maximum wear. That is why the majority of manufacturers of earth-moving equipment find exactly what they need in Johns-Manville Industrial Friction Materials.

Time and again, J-M Industrial Friction Materials have set records for endurance and low-cost operation. That's not surprising, for J-M friction products are engineered for the job. Whether in block, lining, facing or cone form, they are formulated for maximum service life and top performance.

When it's time to replace clutch and brake friction materials on your own machines, take a tip from the manufacturers and specify Johns-Manville. In that way you can be sure that your equipment will continue to give the excellent service the maker built into it.

Write for your copy of "Johns-Manville Industrial Friction Materials" FM-12A. It contains a wealth of important application and performance data. Address: Johns-Manville, Box 60, New York 16, N. Y.

Johns-Manville
INDUSTRIAL FRICTION MATERIALS
No. 1 With Leading Manufacturers

F. J. Ebeling

The appointment of Fred J. Ebeling to a newly-created post as general sales manager of the Dodge Manufacturing Corporation, Mishawaka, Ind., has been announced.

Mr. Ebeling has been associated with the company since 1943, when he became credit manager. Soon after he was elected assistant treasurer and later assistant secretary and treasurer.

Directors of the Air Reduction Company, Inc., have elected Dr. George V. Slottman a vice-president. He has been the company's director of research and engineering since 1949, and will continue in charge of that activity.

The Cleveland Vibrator Company, 2828 Clinton Avenue, Cleveland, Ohio, has recently appointed Randolph L. Ruhley resident sales engineer for the ten Atlantic coastal states from Maine to Maryland, including New York.

Bath Iron Works Corp., Bath, Pa., and its subsidiary, the Pennsylvania Crusher Company, Philadelphia, Pa., have announced that Edwin H. Keiper has been made chief engineer of the crusher concern.

Mr. Keiper joined Pennsylvania Crusher Company as a draftsman, and was appointed chief design engineer in 1939, a position he held until 1949, when he became chief service engineer.

Opening of a new sales office in Tulsa, Okla., at 319 Castle Blvd., has been announced by Sterling Electric Motors, Inc., Los Angeles 22, Calif., to serve the state of Oklahoma. B. G. Jordan has been appointed manager of the new office.

Another new sales office was also opened in Buffalo, N. Y., at 63 Liston Road. J. W. Byrnes, manager, is in charge.

Willys-Overland Motors, Inc., has announced the appointment of D. F. McVey as regional sales manager and J. C. Caspary as assistant sales manager for the company's Southwest sales region, encompassing Texas, New Mexico, Oklahoma, Arkansas, and Louisiana. Both men will have headquarters at Dallas.

Mr. McVey was formerly vice-president and general manager of the Willys Motors, Inc., distributorship at Minneapolis. Mr. Caspary was a former Dallas zone district manager for Oldsmobile.

Another appointment announced recently by Willys-Overland was that of Theodore Worthman as director of internal audits and procedures. Mr. Worthman was formerly with General Motors.

John R. Ramsey succeeds Hugh L. Coats as sales manager of Flexible Steel Lacing Co., Chicago, Ill. Mr. Coats will continue his work as secretary and a director of the company.

The Babcock and Wilcox Company recently moved from its general offices on Liberty street to new quarters in the Chrysler Building East, 161 E. 42nd street, New York, N. Y. The firm has maintained headquarters in the downtown district for over 75 years.

Five floors, totaling about 120,000 sq. ft. of space, will be occupied by the firm in the Chrysler Building.

S. F. Armington

Directors of the Euclid Road Machinery Company elected Stewart F. Armington chairman of the board. He succeeds his father, G. A. Armington, who was elected honorary chairman after serving as board chairman ever since the company was incorporated in 1931.

Stewart Armington, one of the founders of the company, was formerly vice-president. G. E. Armington succeeds him as vice-president, engineering; and Hugh T. Monson is vice-president, manufacturing.

Appointment of a new district manager, Wilton G. Smith, in the mid-central territory was announced by officials of the Hyster Company, Portland, Ore. Mr. Smith had been manager of the company's Washington office.

Frank T. Magennis of The Goodyear Tire & Rubber Export Company has been re-elected chairman of the board of the International Road Federation (I.R.F.).

Mr. Magennis, a vice-president of Goodyear Export Company since 1944, was re-named to the I.R.F. post (which he held last year) at the first world meeting of the group in Washington, D. C., in May of this year.

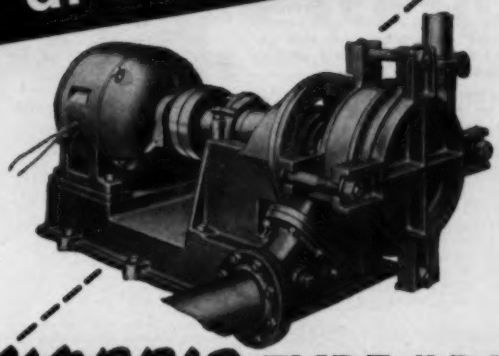
P. C. McGrath, formerly sales manager of the St. Louis Sales Division of Bemis Bro. Bag Co., has been appointed assistant manager of the St. Louis bag factory and Sales Division.

R. W. Lahey Jr. has been assigned to the newly-created position of textile and paper bag specialist at the plant in Norfolk, Va. In his new position he will work with both manufacturing and sales departments of the Norfolk Sales Division.

A. N. Weeks, manager of the plant at East Pepperell, Mass., and R. J. Williams, machine design section of the Bemis General Engineering Department, St. Louis, Mo., have returned from a tour of Europe. They inspected paper-bag-making equipment and methods in England, Scotland, Belgium, Germany, France, and Italy.

The appointment of James W. Pearcy as assistant to the vice-president in charge of sales of Fruehauf Trailer Company has been announced.

EASIER MAINTENANCE at LOWER Cost



MORRIS TYPE "R" SLURRY PUMPS

FOR CEMENT MILL USE—

The Only Pump With All These Features!

1. *The gland is under suction pressure only.*

Unlike conventional pumps, the packing in the Morris Type "R" is under suction or positive head pressures only. It handles suction lifts with a hub sealing pressure of 2 or 3 psi. Under positive head, the pressure on the hub sealing ring need not be greater than the head at the intake.

Operation under low pressures reduces wear and tear of abrasive solids . . . practically eliminates packing troubles.

2. *Easily dismantled by loosening four bolts.*

To remove the impeller, simply loosen four bolts, slip them out of disc slots and pull off end cover. Suction and discharge piping remains undisturbed . . . and the impeller comes out by threading it off the shaft.

Worn clearances on suction side of impeller are easily closed by tightening four adjusting screws.

3. *Shell interchangeable for right or left hand rotation.*

Suction and discharge nozzles can be rotated around axis of pump to positions in any of the four quadrants. All together, there are 72 different nozzle locations.

4. *No internal studs or bolts. No troublesome internal fits and joints.*

ALL THESE FEATURES MAKE THE MORRIS TYPE "R" PARTICULARLY SUITED TO CEMENT MILL USE.

The experience of 83 years in the designing and building of pumps is at your disposal. Let our engineers help you select the exactly right pump for your particular needs. No charge or obligation.

MORRIS MACHINE WORKS, Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS Centrifugal Pumps

New and Better Diamond Bits
for
Modern High Speed Drilling

Always the leader in its field, Sprague and Henwood, Inc. has been working for a number of years on the development of new types of Diamond Bits, to supplement their well-known "TRUCAST" bits, which are still unsurpassed for many diamond drilling requirements.

NOW, after having been thoroughly proved by Sprague and Henwood's contract drilling crews, under every variety of drilling conditions, these new bits are available to other users. Two new types of "Powdered Metal" matrices; improved "Cast Metal" matrices; "Impregnated" coring bits; a new faster-cutting "Taper" bit for drilling blast holes in very hard rock —are all illustrated, described and tabulated in a new 16-page bulletin, No. 320. Write for it today if you can use it to advantage.

DRILLING MACHINES
and Accessory Equipment

To get the full benefit of our new diamond bits you need drilling machines with plenty of power and a wide range of both speed and feed. Model 40-C is our latest-model core-drilling machine and can be relied upon for best possible all-round results on holes up to 1000 feet in depth. Other modern machines provide for very deep core-drilling and for either core-drilling or blast-hole drilling underground. We also manufacture a complete line of improved accessory equipment. Illustrated bulletins containing detailed information mailed promptly.

CONTRACT DRILLING
Besides being manufacturers we are one of the oldest and largest contractors for any type of core drilling. Experienced crews are available at all times for service anywhere in the world. Estimates submitted promptly on request.

SPRAGUE & HENWOOD, Inc. Scranton 2, Pa.
See our four-page insert in the Mining Catalog

...Bluestone Quarry...

another tough job
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ROK-BITS

Rok-Bits are depended upon to help maintain the average 200 tph output at Bluestone Quarry, Thomasville, N. C., operated by Superior Stone Co. Here primary drilling is done with 2½ inch, 4-point Rok-Bits. Everywhere Rok-Bit results have created a complete revolution in drilling performance and economy. Inquire how Rok-Bits can boost your output, cut your costs. Rock Bit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. *Branch:* 350 Depot St., Asheville, N. C.

Tungsten carbide, Rok-Bits: 4-Point, Cross-Bit or 2-Point, Chisel Bit—gauge sizes, 1¾" to 4".

ROCKBIT
SALES AND SERVICE CO.

CARBIDE ROK-BITS · INTRA-SET DRILL STEEL
ALL TYPES OF HOLLOW DRILL STEEL, etc.

L. W. Harris, president of Ames Harris Neville Company, San Francisco, Calif., has announced his retirement. He was associated with the paper bag company for more than 55 years. Mr. Harris will remain as a member of the board of directors. Succeeding him as president of the firm is Fletcher Ames.

J. C. Baseheart

L. F. Shoemaker, vice-president of the Buda Company, Harvey, Ill., recently announced the appointment of J. C. Baseheart as general sales manager of the Engine Division of the firm. Mr. Baseheart is responsible for all wholesale and retail sales of Buda engines and generators.

A Buda employee for 26 years, Mr. Baseheart has been sales manager since last year, after having served 11 years as president of the Buda Engine & Equipment Company at Dallas, Tex. Previously he had been manager of the Oil Field Division of The Buda Company.

The Detroit branch offices and warehouse of the United States Rubber Company were recently moved to an ultra-modern building. The branch will serve as distributing headquarters for all U. S. Rubber products in the territory. It contains 125,250 sq. ft. of floor space, and has loading space for ten trucks.

The General Electric Company will supply more than $100,000 worth of electrical switchgear and distribution equipment for the Alpha Portland Cement Company's expansion of its Jamesville, N. Y., plant.

With a total construction cost of $3,000,000, the expansion program, when completed this summer, will double the Jamesville output to 2,400 barrels of cement per day. New installations included in the program will be an 11-by 375-ft. rotary kiln, a conventional clinker storage area, and 8- by 40-ft. Compeb mills for grinding both raw material and clinker.

The Rust-Oleum Corporation, 2799 Oakton Street, Evanston, Ill., has appointed 12 new industrial distributors: Galen Paint Company, 201 Main Street, Toms River, N. J.; Metropolitan Paint Co., 1015 11th Street, Washington, D. C.; Industrial Equipment & Engineering, 1649 East Street, Pittsfield, Mass.; Summers Hardware & Supply Co., Johnson City, Tenn.; Masek Auto Supply Company, Inc., Gering, Nebr.; Masek Auto Supply Company, Inc., Casper, Wyo.; The Adkins & Douglas Co., Hurlock, Md.; Stebbins-Anderson Co., Inc., York Road, Towson, Md.; Parsons Brothers, Inc., 21-37 E. Washington Avenue, Bridgeport, Conn.; Carey Brothers, 636 North Broadway, White Plains, N. Y.; M. A. Hartnett, Inc., Railroad Ave. and Forrest St., Dover, Del.; Superior-Sterling Company, Bluefield, W. Va.

International Nickel Company of Canada, Ltd., has announced the following promotions:

Dr. Paul D. Mericka, formerly executive vice-president and a director, was elected president of the firm and president of International Nickel Company, Inc., its U. S. subsidiary.

Dr. John F. Thompson, former president of both organizations, continues as the chairman of the board of both companies.

R. Leslie Beatty, vice-president and general manager of Canadian operations, has been elected a member of the executive committee of the board and a director of the U. S. subsidiary. H. F. C. Mockridge was also elected to the executive committee of the board. J. R. Gordon, assistant vice-president, has also been appointed assistant general manager, in charge of all Canadian operations.

Ralph D. Parker, assistant vice-president, has been elected vice-president and a director of the subsidiary, Canadian Nickel Company, Ltd., which conducts exploration and prospecting.

William F. Kennedy has been named secretary, succeeding Henry S. Wingate, who will devote full time as vice-president and director.

Walter C. Kerrigan, vice-president, International Nickel Company, Inc., has been elected vice-president and general sales manager. L. R. Larson was elected assistant vice-president and assistant general sales manager of the U. S. firm.

Theodore H. Dauchy, Richard A. Cabell, and John A. Marsh have also been promoted to assistant vice-presidents of the U. S. subsidiary company.

O. J. Ellertson

O. J. Ellertson, vice-president of Pioneer Engineering Works, Minneapolis, Minn., has been placed in charge of all manufacturing and procurement operations of the company.

Export sales duties, formerly handled by Mr. Ellertson, will be handled by the domestic sales department under K. E. Brunsdale, first vice-president, and Carl R. Rolf, vice-president and sales manager.

The Westinghouse Electric Corporation, Pittsburgh 30, Pa., has announced the promotion of three managers to vice-presidents of their respective departments. They are:

W. W. Sproul, vice-president in charge of the general industrial products group of divisions, which comprise the Micarta, Standard Control, Small Motor, Elevator, Sturtevant, Welding, and Lighting divisions, and The Bryant Electric Company.

L. B. McCully, vice-president in charge of the East Pittsburgh division.

H. E. Seim, vice-president in charge of the Sturtevant Division, with headquarters at Boston, Mass., and also The Bryant Electric Company, a wholly-owned subsidiary at Bridgeport, Conn.

Familiar Scenes
IN MINING SERVICE

Ventilating Lines by NAYLOR

You see Naylor Pipe widely used in push-pull ventilating service because its exclusive structure gives it so many more performance advantages. Light weight makes it easier to handle and install. The Lockseam Spiralweld creates a reinforcing truss, assuring additional collapse strength and permitting use of lighter gauge material without sacrifice of performance. The larger the pipe diameter, the more this is true. Combined with the Naylor Wedge-Lock coupling, Naylor Pipe gives you a tight line that hugs the wall and can be coupled quickly with only one side of the pipe in the open. Re-use and high salvage value are also important features. It will pay you to get the complete story.

Write for Bulletins 507 and 514

Naylor Pipe Company
1257 E. 92nd St., Chicago 19, Ill.
New York Office:
350 Madison Ave., New York 17, N.Y.

YOUR MONEY BACK

IF IT PLUGS

Basically, the Flex-Valve is just a piece of flexible tubing and a clamp to squeeze it shut. It can no more clog than a length of pipe. So, if you can clog one of them in normal service, just tell us, for the "incredible-but-true" record, how in the world you did it, and we'll send your money back.

Flex-Valves have solved thousands of valving headaches —in as many plants as there have been installations made. They can handle anything that flows, including aerated or fluidized solids. They close bubble-tight over ⅛" solids. Open, the flow is straight-in-line with the service piping, and completely unobstructed. There are no moving parts in contact with the lading fluid. Available in both natural and synthetic materials for every corrosive or abrasive service.

Complete details on this unique principle of control valving in slip-on, flanged, and air-motor operated types are available on request. Ask for **Bulletin 500***—without obligation, of course.*

Farris FLEXIBLE VALVE CORP.

341 COMMERCIAL AVE. • PALISADES PARK, N. J.

1192

Joy Manufacturing Company, Henry W. Oliver Building, Pittsburgh 22, Pa., has announced the election of William L. Wearly to the post of general sales vice-president in charge of all domestic sales, including Canada and Mexico.

Mr. Wearly joined the engineering department of Joy Manufacturing in 1937 and has served as service manager and vice-president, coal machinery sales.

A. E. Dorn

A. E. Dorn has been named industrial sales manager, Tractor Division, Allis-Chalmers Manufacturing Company, according to a recent announcement. He succeeds R. M. Stone, who has resigned to become associated with the Allis-Chalmers industrial dealership in St. Louis, Mo.

Mr. Dorn has been Pacific Coast territory manager since 1943, supervising sales including industrial products in the Western states, British Columbia, and Alaska.

The appointment of new branch managers of The Howe Scale Company, Rutland, Vt., was announced recently.

Fremont Fisher, formerly Philadelphia branch manager, becomes manager of the Chicago branch. Manuel J. Kauffman, formerly salesman at the Philadelphia branch, is promoted as its manager. John R. Berry, formerly salesman at the Houston branch, becomes manager of the Denver branch. Charles J. Koch becomes New Orleans branch manager, succeeding Clinton C. Roming, who has retired after 30 years of service. O. B. Phillips, formerly salesman at the Seattle branch, is promoted to manager, succeeding the late Albert N. Lyons.

The following personnel shifts and staff additions in the Dust & Fume Control Division, American Wheelabrator & Equipment Corporation, Mishawaka, Ind., have been announced:

W. S. Schamel, formerly sales engineer, has been advanced to assistant technical director. G. W. Roper, J. K. Davidson, and F. A. Lindahl have been named project engineers.

Three additional engineers have been added to the staff as project engineers: W. G. Carrie, a veteran of 25 years with Consolidated Mining and Smelting Company; W. H. Williamson, formerly a chemical engineer and industrial hygiene engineer with Procter & Gamble; and F. R. Culhane, who comes from Phelps-Dodge Corporation, where he was assistant dust control engineer.

A press brake that is reported to be the largest in its area of the country has been installed recently by the Easton Car and Construction Company, Easton, Pa. The brake is capable of bending ½-in. cold steel plates up to 20 ft. long. It will be used to form large car and truck sections.

Associated Equipment Distributors announces that its offices have been moved to 30 E. Cedar Street, Chicago 11, Ill. The new quarters will provide more room for the activities of the organization, which serves dealers in heavy equipment.

The transfer of E. S. Elgin from Chase Bag Company's Philadelphia branch to its Chicago general sales office has been announced by company officials.

Mr. Elgin has handled East Coast speciality product sales for Chase until his

E. S. Elgin

H. E. Dennie

transfer. In his new duties, he will direct the sales and promotion of crinkled paper and polyethylene and waterproof products.

H. E. Dennie, formerly Chicago Chase sales representative, has been appointed sales manager of the Philadelphia branch territory.

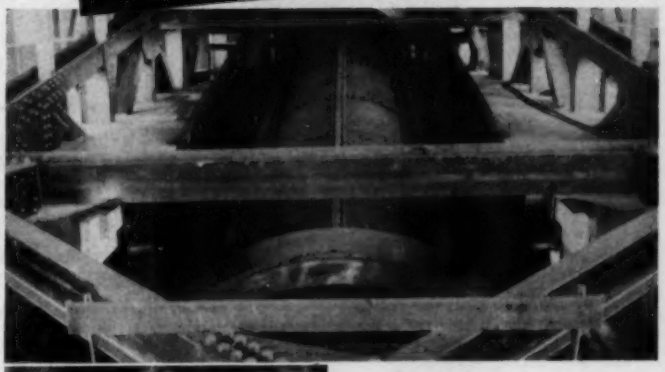
The board of directors of Oliver United Filters, Inc., New York, have announced the appointment of E. L. Oliver Jr. to the position of executive vice-president. In his new post he will retain the duties of manager, but will have broader administration responsibilities.

In his nineteen years of association with the company, Mr. Oliver has served in many capacities. He is well-known to the many customers of Oliver United, having spent several years in sales and field engineering.

Link-Belt Company has announced the appointment of James H. Oakes, former sales manager for enclosed drives, as sales manager for the Philadelphia plant, and Byron K. Hartman, former assistant sales manager at Philadelphia, as sales manager for the new Colmar plant. George A. Most Jr. has been appointed district manager at Moline, Ill., to succeed Stuart T. Penick. William L. Hartley, formerly sales manager at the company's Philadelphia plant, has been transferred to executive sales headquarters at Chicago to specialize in the application of long-haulage belt conveyors and to assist on other major engineering projects.

The Rocky Mountain Machinery Company, Salt Lake City, Utah, has been named the distributor in Utah and southeastern Idaho for the New York Belting and Packing Company, for belting, hose, packing, and other industrial rubber goods.

For long wear and high production use YUBA SCREENS and CONVEYORS



YUBA makes Abrasion Resisting Steel Screens, flat or revolving, for all screening purposes—separating, scrubbing, sizing. Holes are taper drilled to prevent clogging, can be small and closely spaced for screening sands bearing monazite and other rare earths. All thicknesses from ¼" up; other dimensions as big as your needs—screen shown is 50' long, 9' diameter, weighs about 65 tons. Competitive prices—ask for quotations.

YUBA-built conveyor pictured can handle 1440 tons per hour, is part of nearly mile-long conveyor system carrying crushed rock (minus 8") from pit to plant to stockpile. Yuba has built hundreds of heavy-duty conveyors for rock, gravel and sand since 1909. Put this experience to work on your conveying problems NOW.

SCREENS,
CONVEYORS,
DREDGES,
built-to-order machinery—Yuba will gladly furnish estimates. Wire, write or call—no obligation, of course.

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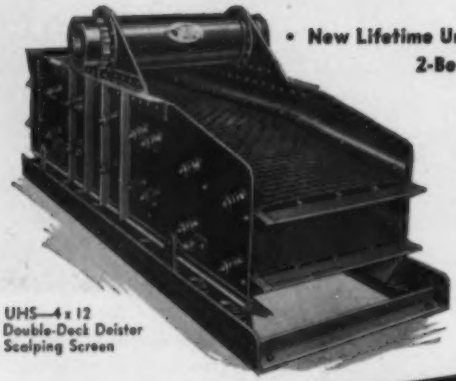
Room , 351 California St., San Francisco 4, California, U. S. A.

AGENTS { BINE, DARBY & CO., LTD. · SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E. C. 3.

CABLES: YUBAMAN, San Francisco · SHAWDARBCO, London

New DEISTER
Heavy-Duty Scalping Screen



UHS—4 x 12
Double-Deck Deister
Scalping Screen

• New Lifetime Unitized Headmotion—
2-Bearing Construction—
Runs In Bath of Oil

Opposed Elliptical Throw • Powerful Vibration • Automatic Screen Cloth Tension • Vibration Fully Cushioned • Rugged Construction

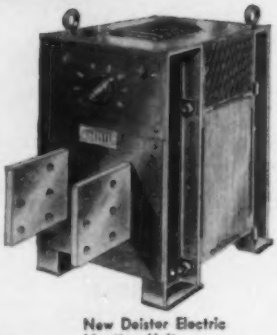
New DEISTER
Electric Heating Unit

for SCREENING DAMP MATERIALS

NO DOWN TIME for cleaning fine or medium screen cloth—you can screen fine, moist materials *continuously* with the new DEISTER heating unit.

GREATER CAPACITY—more tonnage goes through—you get better separation—because heated screen cloth *remains* open.

CUTS COSTS—In addition to saving cleaning time and labor costs, DEISTER heating units will lengthen life of your screen cloth up to three times by eliminating pounding or brushing to free it of blinding material. Get more details from your nearest Deister dealer, or phone, write or wire the Deister Machine Company, Fort Wayne, Indiana.



New Deister Electric Heating Unit.

DEISTER SCREENS

DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA

W. H. Franklin

William H. Franklin, controller of Caterpillar Tractor Co., has been elected a vice-president of the company by the board of directors. Mr. Franklin assumed the additional duties of secretary on July 1, replacing E. Bornstein, who retired after 30 years of service with the company. A. N. Whitlock, assistant controller, is the new controller.

Harold C. Fleming Jr. has been appointed supervisor of Trackson advertising at Caterpillar Tractor Co., Peoria, Ill. He is transferring from a similar position at the Trackson Company of Milwaukee, Wis., now a wholly-owned subsidiary of Caterpillar.

A. N. Whitlock

H. C. Fleming

Westinghouse Electric Company, Pittsburgh 30, Pa., has announced personnel changes in two divisions. Joseph S. Parry Jr. has been appointed assistant manager of the Apparatus Division. He was formerly industrial manager of the eastern district.

J. C. Fink, formerly assistant to the vice-president in charge of engineering, has been named engineering manager of industrial products. F. D. Weatherholt has been named sales manager of industrial products. He previously was manager of the Apparatus Division's industrial department.

W. B. Lawrence, general manager, Cummins Diesel Sales Corporation, with headquarters at Columbus, Ind., recently was elected a vice-president of the sales corporation at a recent meeting of the Corporation's Board of Directors.

Harold H. Hall, formerly general service manager, is now general manager, Cummins Diesel Export Corporation, with headquarters also at Columbus, Ind.

Charles C. Sons, formerly eastern service manager, has been named acting general service manager for Cummins Engine Company, succeeding Mr. Hall.

Appointment of the Olson Equipment Company, 2930 Blaisdell Avenue, Minneapolis, Minn., as distributor for Nordberg diesel engines in Minnesota and northwestern Wisconsin was announced by the Nordberg Manufacturing Company, Milwaukee 1, Wis.

legal decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

This last April the writer, while on a trip in southern states, made a special effort to call on and talk personally with officials, owners and employees in plants which process and sell nonmetallic products. These conversations proved to be interesting, as well as informative; they form the basis of this article.

Fair Labor Standards Act

An official of a sand-and-gravel and concrete block company made this statement: "A couple of years ago a partly invalid man named White came to me and said that he would sleep on our premises and act as a night watchman if we would furnish him a place to sleep and pay him $5 a week. I accepted his proposition. Now White is suing our company for over $5,000 back pay, which he claims is due him under the Fair Labor Standards Act. He claims that he was on duty ten hours a day for seven days a week, which means that according to this law we should have paid him 75c per hour for the first forty hours and time and one-half for the remaining 30 hours overtime each week. Could we be liable, since White agreed to sleep on our premises and act as watchman for $5 per week? Do you think this law is a fair and just one?"

It would be of little avail for the writer to state whether he believes the Fair Labor Standards Act to be fair and just under all circumstances. The important point is that a few years ago our Congress enacted the Fair Labor Standards Act with a minimum wage of 25 cents per hour. A few years later the Congress increased the minimum wage to 40 cents per hour, and more recently it increased the minimum wage to 75 cents per hour, with compulsory payments of one and one-half the regular wage if the employee works over 40 hours a week. At present this is the enforceable federal law.

My answer is: Your company is liable to White for $5,000, plus penalties, attorney fees, and the like. This is so because the Fair Labor Standards Act does not excuse an employer from failure to pay a minimum of 75 cents per hour for the first 40 hours a week, plus time and one-half for overtime, although the employee signs a written contract to work for lower wages.

According to a late higher court decision, a night watchman who guards merchandise and equipment used in interstate commerce is entitled to wages specified by the Fair Labor Standards Act. This rule of law was established in *Martin v. Graham Company*, 176 S. W. (2d) 843. In this case the testimony proved that a night watchman was employed to guard merchandise received or intended to be shipped in interstate commerce. The employee worked from January 15 until June 27, seven days a week, and he regularly began working at 5:30 p.m., and worked until 7:30 a.m., or 91 hours per week. His duties consisted of guarding motor vehicles in the yard to prevent thieves from molesting them, and opening and shutting the gates for trucks which hauled goods in interstate commerce.

The employee sued to recover a considerable sum, which was time and one-half for the hours he had worked each week over 40 hours, and also the difference between the hourly wages he was paid and the minimum wages specified by the Fair Labor Standards Act. The higher court held in favor of the employee, and said:

"There was ample evidence upon which to base a finding that plaintiff's (employee's) wages and hours were governed by the Fair Labor Standards Act."

Also, following higher court cases: *United*, 225 S. W. (2d) 550; and *Moffat*, 89 N. E. (2d) 892.

When Corporation Official Is Personally Liable

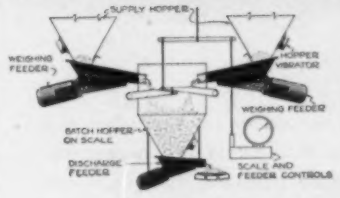
Considerable discussion has arisen from time to time over the legal question: "Under what circumstances is an official of a corporation personally liable for debts of a corporation which becomes insolvent?"

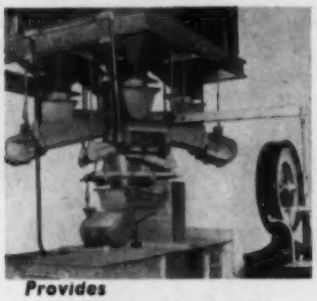
The answer is: The official is liable only when the testimony shows that the seller believed the official *intended* to be personally liable, and no fraud is involved.

Ordinarily, an official of a corporation is personally liable for payment of a debt which he fraudulently incurs, although such debt is assumed for the benefit of the corporation. On the other hand, in order that a corporation's official is personally liable for false assertions, made to benefit a corporation, it must be proven that the seller actually relied upon such statements when extending credit or making a contract. Otherwise the official is not liable.

For instance, in *Lawson-Richards v. Blalock Company*, 30 S. W. (2d) 797, it was disclosed that a man named Lawson had for many years been engaged in his own business and purchased much cement, sand, and gravel, and had frequently made other purchases from

SYNTRON
"Automatic"
BATCH WEIGHING





Provides
ACCURACY OF BATCH
SIMPLE CONTROL
SELECTIVITY

—start working with the push of a button.

Vibrators on bins and hoppers keep the materials free-flowing. The vibratory feeders automatically filling scale hoppers to exact weight and discharging onto secondary vibratory feeders, smoothly emptying each accurately weighed batch into mixers, blenders, belt conveyors, etc.

Any one, or a combination of any number of materials may be batched, accurately and automatically, at the same time.

Write Today For FREE Illustrated Catalog Folder 'BW'

SYNTRON COMPANY
385 Carson Avenue Homer City, Penna.

Macatee and Sons. Lawson ceased business for a time and later formed the Lawson-Richards Corporation, of which he was president, and under which he conducted the former business. Purchases from Macatee and Sons were continued and the account was carried in the name of Lawson, although the purchases were for the corporation.

Later the seller, Blalock Company, sued Lawson personally to recover the amount due when the Lawson-Richards became insolvent. The suit was based on the grounds that the corporation was a "mere pretense" created by Lawson to avoid personal liability for his debts.

However, because of the fact that it was not proved that the Blalock Company relied upon the statement of Lawson that he was making the purchases for himself, the court held Lawson not personally liable, saying:

"Regardless of the relations between Lawson and Macatees, Lawson was merely lending his credit to the corporation, and if he had personally paid the debt, he would have been entitled to reimbursement from the corporation. We see no escape from either of these conclusions. They are elementary and need no citation of authority."

Therefore, it is quite apparent that an official of a corporation cannot be held personally liable on a debt for nonmetallic products if the testimony shows that the seller made the delivery when relying on payment from a source other than the official.

On the other hand, if a corporation's official signs a purchase contract for the corporation, he may be personally liable if the testimoney shows (1) that the seller did not know whether the official or the corporation intended to be liable, and (2) that the official signed the contract not as legal agent of the corporation. Recently a higher court held that corporation officials and other employees who want to be certain to avoid being personally liable on contracts signed by their employers should include in the body of the letter or contract the name of the employer and also sign the same as "agent" of the employer. The proper signature of either an employee or an official of a corporation is: "The White Company, per A. W. Doe, agent for the White Company".

Foolish Injury

Considerable discussion has arisen from time to time over the legal question: "Can an injured employee always recover compensation under the State Workmen's Compensation Act for his injuries?"

The answer is no. An employee who is injured while acting outside the scope of his employment never is entitled to compensation under the State Workmen's Compensation Laws.

See *Eagle Company v. Davison*, 132 Pac. (2d) 937. Here is was disclosed that an employee in a quarry found a dynamite cap. He began playing with it and amusing himself by striking the cap against objects and by attempting to frighten his fellow employees by pretending that he was going to touch a match to the cap. While so amusing himself with the cap, it exploded in his hand causing severe injury to his hand.

The injured employee filed a claim for compensation on account of disability which resulted from the injury.

Although the Industrial Commission awarded the employee compensation, the higher court reversed the verdict, saying:

"An injury sustained as the result of play indulged in by an employee for his own amusement does not arise out of the employment and any disability resulting therefrom is not compensable."

Also, see *Stark v. Martin Company*, 37 Alt. (2d) 651. In this case an employee while working at his regular job was asked by a truck driver to assist him. This work was unrelated to the business of the company. The employee was seriously injured and sued the company for compensation. However, since the employee was not acting within the scope of the employment when he sustained the injury, the higher court held the company not liable, and said:

"The injury must have had its origin in a risk connected with the employment, and to have flowed from that source as a rational consequence."

Must Pay Minimum

Recently an official of a sand-and-gravel company wrote as follows: "Our corporation signed a lease contract with a land owner, a few years ago, which gave us the exclusive right to remove

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More Information, Please

CHECK AND MAIL THE CARD BELOW FOR ADDITIONAL INFORMATION ON NEW MACHINERY AND SUPPLIES

1. Dust and Fume Topics. Vol. 1, No. 1. This is the first issue of a bulletin type publication that is intended to present information and data on the control of industrial dust and fumes. The first issue presents some of the results obtained in such plants as stone crushing and roofing manufacture. The stories are written as news and do not become technical. They are designed to point out the many uses for the dust collectors built by the company. American Wheelabrator & Equipment Corp.

2. Natco Protective Paper Products for Wrapping, Packing and Shipping. This six-page folder presents a line of crinkled kraft paper products for packaging. Multi-wall bags, liners, car load binders, and wrapping are illustrated. Advantages of the material and the types available are covered. National Waterproof Papers, Inc.

3. Seeing Isn't Always Believing . . . it depends on what is seen. Form No. 147. The sixteen pages of this booklet cover the seven methods of non-destructive testing that are in use by the company for field and laboratory testing of machine parts and many other products. Testing equipment for using magnetic forces, ultrasonics, fluorescent materials, black light, and other methods are illustrated and described. Suggested applications of the methods are given. This booklet contains much interesting information for anyone who is concerned with detecting failures and imperfections early. Magnaflux Corporation.

4. The New Remington Industrial Gun. Form 5-11-45. The twelve pages of this folder cover the construction, operation and use of a gun especially designed for removing clinker rings in kilns, for scaling walls and roofs in mines and quarries and for various other industrial uses. The gun uses a mount that is fastened to some object such as a kiln end, or truck. It is adjustable vertically and horizontally, and has built in sights for easy aiming. The folder explains all the parts of the gun and gives operating and maintenance instructions as well. Remington Arms Co. Inc.

5. Standard Trailer Axles and Brakes. This two-page catalog sheet illustrates trailer axles and brakes on one side and shows a cutaway view of the spindle on the other. General specifications of both tubular and trunnion axles are given. Standard Forge and Axle Company.

6. Wearproof and Dustproof Concrete Floors with Lapidolith. The six pages of this folder use photos to show some of the buildings where the material has been used. Text presents major points of information about Lapidolith such as results, application, action, and suggested uses. Tables show the results of tests on many features of the material. Testimonials and a list of users occupy a page. L. Sonneborn Sons Inc.

7. Katolight Generators, Motor-Generators, Converters, Power Plants. The four pages of this folder illustrate and present the features of the power producing and converting equipment made by the company. Tables list the types and sizes available while the text points out features. Kato Engineering Company.

8. U. S. Electrical Wire and Cables for the Coal Mining Industry. Form No. W-51-7. The fifty-two pages of this booklet cover a wide range of electrical cable for every use around mines or quarries. Power cable for corrosive conditions, telephone cable, lighting cable, blasting wire, and many other types are listed. Synthetic and natural rubber covered cables are listed that cover a wide range of applications. One, two, three, and four wire conductors are available in most of the types, and a few have as high as seven conductors. Types are listed for all common voltages up to 5,000. In addition to presenting information on the cables the booklet also contains information on splicing the various types of cable and on insulating the splices. United States Rubber Company.

9. Clement Dump Trailers. The four pages of this folder present the major features of a trailer built especially for hauling aggregates, and the details of the unique dumping mechanism which uses a winch and lift arms to raise the trailer for discharge of the load. Diagrams and photos show the various methods of dumping with the trailer. The text points out the features of the trailer. Winch-Lift Inc.

10. Simplicity in Pictures. Asphalt plants are the subject of this 24-page booklet. Photos are used to show the development of the equipment, construction details and a great many plants using the equipment. The simple erecting of a plant is shown in a series of photos that cover the process step by step. Pictures are also used to show the component machines that make up an asphalt plant. The Simplicity System Company.

11. Terratrac. The Complete Farm and Industrial Crawler. This envelope enclosure gives specifications on three sizes of crawler tractors ranging from 20 to 28-hp. Attachments such as dozer, angle-dozer, forks, loader, and back hoe are shown, and additional features such as interchangeable rubber and steel track shoes, power take-off, and adjustable track gauges are covered. American Tractor Corporation.

12. Report on the Advantages of Nopco Ertrane C. Ind.-85-52. This eleven-page booklet covers the use of Ertrane C in portland and masonry cement. The specifications for the proper mixing and application of the product, as well as the unabridged report on tests conducted under ASTM Specifications are included. The advantages of using Ertrane C are cited including the chemical and physical properties of the resulting product. A summary of the development of the company and its subsidiaries is given. Nopco Chemical Company.

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13. Gardner-Denver Deep Hole Drilling Equipment. Bulletin DHD-1. The "Ring Seal Shank" is the novel feature pointed out in this four-page catalog insert. The ring seal is described and illustrated. In addition to the ring seal shank the folder also covers bit adapters, couplings, sectional rods, drills, bits, and fishing tools. Gardner-Denver Company.

14. Conveyor and Elevator Belting. Form NY-1697-C. The thirty-two pages of this booklet illustrate the many types of belting made by the company. Each type is illustrated by a photo that shows the actual use of the belt. The application is given, the construction is described and the features are pointed out in the text. Sizes are listed for each type. In addition to listing the types of belting, the booklet also contains a large amount of information on the capacity of belts, drive factors, horsepower factors, splicing, training, loading, unloading, belt inclination, idlers, pulleys, take-ups, lubrication, care, and injuries. Elevator belting is covered in the same manner and tables are included on bucket capacities, weights of common materials, and similar points of information. New York Belting and Packing Company.

15. Now 4 Versatile Truck-Man Models. The eight pages of this bulletin are divided equally between illustrations and specifications of the four models and general features of the entire line. The four models shown are a skid-lift, a pallet carrier, a platform truck, and a towing tractor for wheeled trucks. Special purpose models are shown on the back page, including special platforms for handling concrete blocks, racks, and tile. Truck-Man Division of The Knickerbocker Co.

16. Lubrication and Maintenance Guide for Contractors and Allied Equipment. 4th Edition. This handy pocket-size booklet contains 96 pages of information on the lubrication and maintenance of equipment for quarries, crushed stone plants, sand and gravel plants, asphalt plants, ready mixed concrete plants, dredges, and many others. Among the machines covered are air compressors, air tools, shovels and draglines, conveyors, crushers and elevators. Engines, gears, transmissions, chassis and crawlers are some of the other items included in the booklet. Gulf Oil Corporation.

17. AgiTair Industrial Furnaces for Process Drying and Product Heating. Form No. HGF-101-12-46. The twelve pages of this bulletin are given over to the story of the industrial direct-fired furnaces used for drying and heating. Among the equipment they are used with are dryers, pulverizers and similar equipment and for heating asphalt and other liquids. Various models are illustrated and complete descriptions are included. Large users of the furnaces are listed where they are being used for drying slurry, clay, limestone, shale and abrasives. Air Devices, Inc.

18. Torcon Heavy-Duty Hydraulic Torque Converter. Bulletin TC-690. Information on the heavy-duty automatic hydraulic torque converter fills the four pages of this bulletin. Typical applications of the unit are listed and illustrated such as shovels, cranes, loaders, tractors, and trucks. The components of the converter are shown as well as the assembled unit. Advantages of the unit in providing maximum utilization of engine power at variable speeds and variable loads is pointed out. The Torcon Company.

19. Richardson J-56 Convey-O-Weigh with Traveling Poise. No. 5004. This catalog sheet describes a traveling poise scale which operates in conjunction with a belt or apron type conveyor. The machine is designed to keep an accurate record of the weight of material that it handles. Specifications and a working drawing are included. Richardson Scale Company.

20. Wal-Lok Reinforcing for Masonry Walls. A folder that uses drawings to show the product and its use in masonry walls. Specifications are included as well as application instructions. Adrian Peerless, Inc.

21. To the man who, sometime, may want to select a crusher. Bulletin 452. This brochure explains the different methods of reducing material and then describes the machines in use that utilize each method or a combination of them. The advantages and results obtained by each type of machine are explained. In addition to covering the various aspects of crushing in non-technical language the booklet also illustrates the many types of crushers made by the company. Pennsylvania Crusher Company.

22. The Pitman Hydra-Lift. A truck mounted crane that is suitable for loads up to 6,000 lbs. is the subject of this eight-page bulletin. Details of the mechanism which employs hydraulic cylinders for boom hoist and swing and a winch for the loadline are illustrated and explained. Photos show the unit on the job in several fields including concrete pipe laying, septic tank installing, form and machinery moving, and other uses where a truck-mounted crane is needed. Specifications are included, and the general details of the truck needed are given. Pitman Manufacturing Company.

23. A Story of Tractor Tools and Their Uses. Form 1216-652. Cartoon-style treatment is used in this sixteen-page booklet printed in color to illustrate the uses of the 33 different tractor tools and attachments made by the company. Appearing like many of the juvenile thrillers the booklet is sufficiently different to require a second look. Interesting applications have been selected for treatment. The Hyster Company.

24. Jeffrey Mechanical Vibrating Conveyors. Catalog 849. Pan or tube type conveyors actuated by a mechanical vibrating system are covered in this 12-page catalog. The mechanism and many typical applications are shown in the pictures, while the text explains the features and special modifications available. The Jeffrey Manufacturing Company.

25. Thermocouples, Assemblies, Parts and Accessories. Catalog EN-82. A complete line of thermocouple assemblies and parts is shown in this 44-page catalog. A tabular arrangement lists the accuracy limits, the temperature and physical limits of the couple and its protecting tube, and the recommended materials for general applications. The treatment of special couples includes steam plant, generator, and many others. Component parts are shown and described. Leeds and Northrup Company.

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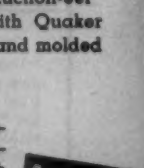

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sand and gravel from the land for ten years. In this contract a clause stated that our corporation would pay the land owner a minimum of $700 yearly rental if we removed from the land a stated quantity of sand and gravel. During the first three years we removed no materials from the land. Can the property owner compel us to pay $700 per year?"

The answer is: Yes, the land owner can compel your corporation to pay $2,100 for the first three years, if the lease contract can be construed to mean that the original intentions of both the corporation and the land owner was that a minimum of $700 annually would be paid, irrespective of the quantity of sand and gravel removed from the premises.

For example, in *Makins v. Shellenbarger,* 289 Pac. 716, it was shown a sand-and-gravel company leased land for 15 years to develop it for commercial sand and gravel. The lease gave the company the privilege of testing the land at any time within the first five years and to dig pits, use the water on the premises, and also extend the lease with or without notice to the property owner. The lease contract also contained a clause to the effect that in the event yardage removed should not yield the lessor or property owner the aggregate, during a period of each succeeding calendar year hereafter, the company is "hereby nevertheless bound and required to pay the lessor the sum of five hundred dollars ($500) for each and every 12 calendar months during the life of the contract".

Litigation developed when the company contended that payment of a minimum of $500 per year was not intended during the five-year test period. The court held the company bound to pay a minimum of $2,500 during this five-year test period, saying:

"A painstaking reading of this instrument convinces us that this minimum rent or royalty was to be paid at the expiration of each year following the execution of the lease. . . It would be a strange contract which turned over plaintiff's land to defendant (company) for a period of five years without compensation and with simply the option, but no obligation on the part of defendant (company) to either test it or develop it. The provision in the lease for the payment of a minimum rent or royalty of $500 per year was about the only incentive the plaintiff (land owner) had for tying up his land in a long term."

Hence, in this case the higher court decided that the original intentions of both the corporation and land owner, when the lease contract was signed, was that the corporation should pay the minimum of $500 rental per year to the land owner.

This court explained that when deciding legal controversies of this nature, it is necessary merely to determine the intentions of the contracting parties when the lease contract was signed.

What Amount of Damages?

A reader asked: "Our truck driver ran over and injured a pedestrian. Do you advise us to compromise the case and pay the injured pedestrian $5,000 damages?"

Well, obviously the extent of the pedestrian's injuries has an important bearing on this case.

In *Jacksonville Company v. Carlile*, 15 So. (2d) 443, the court records show that a sand-and-gravel truck became disabled at night, and it was parked on the highway without flares to warn the public.

The driver of an automobile ran into it. He brought suit against the company and recovered $70,000 damages.

Of course, his injuries were severe, but damage allowances sometimes run very high.

No Sales Tax

A contractor asked this question: "Do I have to pay the state's sales tax on equipment I purchase for use in my own business?"

According to a late higher court decision, the answer is no.

For instance, in *France Company v. Evatt*, 55 N. E. (2d) 652, it was shown that a clause in a state's sales tax law states that where "the purpose of the consumer" is to use the subject of the sale in the "production or processing of tangible personal property", no sales tax shall be collected.

A company engaged in the business of crushing and selling stone purchased certain equipment such as shovels, loaders, etc., which it used in the transportation of crushed stone.

The higher court held that the company need not pay the state sales tax on this purchased equipment, saying:

"Sales of tangible personal property used and consumed in operations consisting of transporting crushed stone products are sales of personal property used in the production by processing of tangible personal property for sale. . . "

Anticipated Damages

A quarry owner asked this question: "Can I sue and recover damages from a purchaser who signed a contract to purchase a certain quantity and quality of marble which I processed to the specifications of the purchaser? The purchaser sent me a letter saying that I need not ship the marble because he would not accept and pay for it."

According to a late higher court decision, this seller cannot now sue and recover damages from the purchaser. This is so because "anticipated" profits are not recoverable as damages for such breach. The legal grounds for excluding such damages are that in the greater number of cases expected, or anticipated profits are too remote, and uncertain to constitute a definite and trustworthy measure of actual damages. See *Ellerson v. Grove*, 44 F. (2d) 493.

Hence, a purchaser who merely threatens to breach a contract cannot be lawfully sued for damages. The seller must wait before filing a suit until the seller has actually breached at least one of his contract obligations.

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CENTRAL TERRITORY RAILROADS FREIGHT TRAFFIC COMMITTEE

Docket 88866 (1)—Proposed to establish on crushed stone, stone screenings, and agricultural limestone (not ground or pulverized), in bulk, in open-top cars, straight or mixed carloads, minimum weight 90 percent of marked capacity of car, as provided for in Item 120, Southern Railway Tariff 1225-K, ICC C-2232 from Marengo and Milltown, Ind., to Cato and Globe, Ind., 125 cents net ton.

Docket 88902 (1)—Proposed to establish on crushed stone, in open-top equipment, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Monon, Ind., to Traverse City, Mich., 250 cents net ton.

Docket 88905 (1)—Proposed to establish on ground or pulverized limestone, carloads, minimum weight 60,000 lb., from Greencastle, Ind., to Rockford, Ohio, 274 cents in open equipment and 323 cents in closed equipment.

GENERAL FREIGHT TRAFFIC COMMITTEE—EASTERN RAILROADS

Bulletin G-5886 (Carrier)—Proposed to establish on stone, natural (other than bituminous asphalt rock), crushed, in open-top cars not protected by tarpaulin or other protective covering, carload minimum weight as per Item 5 of New York Central Railroad Tariff ICC 342, from New Hamburg, N. Y., to Bridgeport, Conn., $2.19 per net ton, subject to ExParte 175 increase.

Bulletin G-5891 (Shipper)—Proposed to establish on limestone, natural, ground or pulverized, unburned, minimum weight 60,000 lb., from Gibsonburg, Ohio, and other northwestern Ohio Group 1 origins to Dresden and Canastota, N. Y., $4.80 net ton and $3.95 net ton, respectively, open cars, and $5.29 net ton and $4.44 net ton, respectively, closed cars, subject to ExParte 175 increase.

ILLINOIS FREIGHT ASSOCIATION

Docket IRC 511-1138 (MRP 6210)—Proposed to establish on limestone, agricultural, ground or pulverized (having value for purpose of soil treatment), carload, in bulk, in open-top equipment, from Marblehead, Ill., Hannibal, Mo., Quincy, Ill., and White Bear, Mo., to

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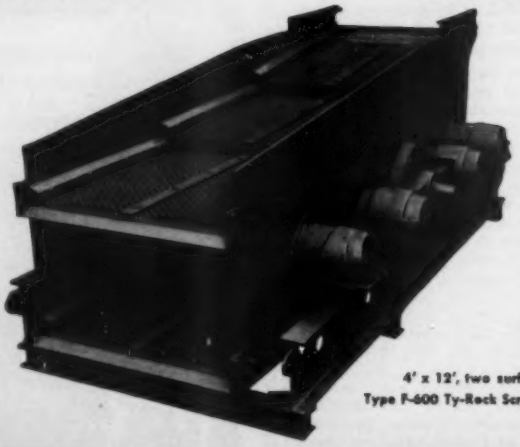

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Table Grove, Ill., Vermont, Ill., and Ipava, Ill., minimum weight marked capacity of car, but not less than 40 tons, except when car is loaded to full visible capacity, actual weight will apply. Present: 94 cents per ton of 2,000 lb., subject to ExParte 175 increase. Proposed: 85 cents per ton of 2,000 lbs., subject to ExParte 175 increase, to expire December 31, 1952.

NORTH PACIFIC COAST FREIGHT BUREAU

Docket X NC-1949 (Supplement 4)—Request to establish rate of 19 cents per hundredweight on limestone, crushed, ground, or powdered, in open-top cars, carload, Cooper, Wash., to Monroe, Oreg.

Docket X NC-2581 (S)—Sand, silica, carload, from Emmett, Idaho, to Vancouver, B. C., request rate of $8.74 per net ton, minimum 100,000 lb.

PACIFIC SOUTHCOAST FREIGHT BUREAU

Docket 2683 (S)—Proposed to establish on gypsum and gypsum plaster, carload, from Phoenix, Ariz., to points on Apache Railroad, 35 cents on gypsum and 44 cents on plaster, minimum 40,000 lb.

Docket 2684 (S)—Request for rate of 38 cents (minimum 40 tons) on lime, common, hydrated, quick or slaked, carload from Nelson, Ariz., to Tucson, Ariz.

Docket 2705 (S)—Proposed to establish on rock, lime, in closed cars, carload, Victorville to El Segundo and Watson, Calif., 9 cents per hundredweight, minimum 50 tons.

WEEKLY DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION PROPOSALS

Docket A 10280 (A)—Stone, broken or crushed, open-top cars, minimum weight as per item 401-D, Southern Freight Tariff Bureau 388-G, Granite Hill, Ga., to Savannah, Ga., 155 cents net ton, not subject to X152-6-8, via Georgia R.R., Augusta, Ga., C.&W.C. Yemassee, S. C.

Docket A 10315 (C)—Limestone, carload, 110,000 lb. (applies only in open-top cars furnished by shippers), from Speers Ferry, Va., to Kingsport, Tenn., 18 cents, net ton, not subject to X-162-6-8.

Docket A 7268 (E.R.R. (S) C-SFA-4914)—Proposed to establish on limestone, carload, from Durbin, Ohio, to Winchester, Ky., 307 cents net ton, not subject to X 162-6-8.

Docket A 7354—Proposed to establish same rates as applicable from Frederick, Md., in Southern Freight Tariff Bureau tariff 382-D on lime, carloads, Thomasville, Pa., to points in southern territory.

Docket A 1861—Proposed to establish on crushed stone, open cars, carload, described in item 401-E, Southern Freight Tariff Bureau 388-G, from Rocky Point, Va., to Clarksville, Va., 185 cents net ton, not subject to X 162-6-8-175. (Intrastate only.)

SOUTHWESTERN FREIGHT BUREAU

Docket 60483 (C)—Proposed to establish on limestone, crushed, ground or pulverized, from Horine, Mo., to Milwaukee, Wis., 403 cents per net ton in open cars, and 452 cents per net ton in closed cars, not subject to X-162-166 or 168 increases.

FREIGHT TRAFFIC COMMITTEE—TRUNK LINE TERRITORY RAILROADS

Docket TL M-2024 (Carrier)—Stone,

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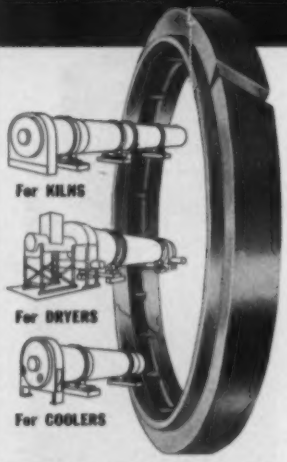
DUE TO DOWN TIME



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Stroh diagonally cored split tires can be installed on kilns, coolers or dryers in *as little as 36 hours*—including reaming of holes and riveting. No need to tear out sections or disturb shell alignment. Mating surfaces, welded after installation, cannot loosen under action of load or heat.

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Stroh PROCESS STEEL CO.

PITTSBURGH 12, PENNA., U.S.A.

natural (other than bituminous, asphalt rock), crushed, in open-top cars not protected by tarpaulin or other protective covering, carload minimum weight per item 5 of New York Central Tariff ICC 342, from South Amsterdam, N. Y., to South Schenectady, N. Y., 93¼ cents per net ton, not subject to ExParte 175 increase.

Docket TL M-2026 (Carrier)—Open hearth slag, suitable for the further extraction of iron, carload minimum weight 90 percent of marked capacity of car, from New Castle, Del., to Coatesville, Pa., $1.71 per net ton, subject to ExParte 175 increase.

Docket TL M-2029 (Carrier)—Proposed to establish a rate of $1.34 per net ton, subject to ExParte 175 increase on stone, natural (other than bituminous asphalt rock) crushed, in open-top cars not protected by tarpaulin or other protective covering, carload minimum weight as per Item 5 of New York Central Railroad Tariff ICC 342, from Oaks Corners, N. Y., to Bilsboro, Dresden, Himrod, Presho, Lindley, N. Y., Lawrenceville, N. Y.-Pa., Tioga, Hammond, Pa., $1.34 per net ton.

Docket TL M-2033 (Shipper)—In order to meet motor truck competition it is proposed to establish a rate of $1.21 per net ton on crushed stone and stone screenings, carload minimum weight 90 percent of marked capacity of car from Auburn, N. Y., to Etna, Freeville and Peruton, N. Y. This rate is subject to ExParte 175 increase.

Docket TL M-2040 (Shipper)—Proposed to establish on limestone, crude, fluxing, foundry and furnace, carload, when loaded in open-top equipment, minimum weight 90 percent of marked capacity of car to Fairless, Pa., from Annville, Avon, Lebanon, Myerstown, Palmyra, and Swatara, Pa., $1.87 per gross ton, subject to ExParte 175 increase.

FREIGHT TRAFFIC COMMITTEE—TRUNK LINE TERRITORY RAILROADS

Docket TL M-2041 (Shipper)—Proposed to establish on limestone, crude, fluxing, foundry and furnace. Except as otherwise provided, rates will apply only when shipped in open-top equipment. During period of car shortage when open-top equipment is not available and closed equipment is furnished at carrier's option, the rates provided for open-top equipment will apply, minimum weight, except as otherwise provided, 90 percent of marked capacity of car from Bellefonte, Chemical, Pleasant Gap, Howard, Pa., and Inwood and Martinsburg, W. Va., to Fairless, Pa., $2.78 per gross ton, subject to ExParte 175 increase.

Docket TL M-2044 (Shipper)—Roasted dolomite (refractory dolomite), in granular form, treated or untreated, clinkered and/or burned to a dead state, carload minimum weight as published in P.R.R. ICC 3119 and West Maryland R.R. ICC 8960 from Billmyer-York, Pa. (P.R.R.) direct and via W. Maryland Railroad and P.R.R. from Botts, Pa., to Fairless, Pa., $3.18 per net ton, subject to ExParte 175 increase.

Docket TL M-2045 (Shipper)—Limestone, crude, fluxing, foundry and furnace. Except as otherwise provided, rates will apply only when shipped in open-top equipment. During period of car shortage when open-top equipment is not available and closed equipment is furnished at carrier's option, the rates provided for open-top equipment will apply, minimum weight, except as otherwise provided, 90 percent of marked capacity of car, from Blue Bell-Devault, via P.R.R. direct and Williams-Cedar Hollow, Pa., via Reading Company direct to Fairless, Pa., $1.36 per gross ton, subject to ExParte 175 increase.

Docket TL M-2066 (Carrier)—To add Pambroke, Pa., as an origin point, subject to the Kimballton-Ripplemead rates, in Agent LeGrande's Tariff 15-A ICC 241 applying on limestone, ground or pulverized, and/or stone dust, carload minimum weight 30 tons, to various destinations on the Baltimore and Annapolis Railroad, the Baltimore & Eastern Railroad, the Baltimore and Ohio Railroad, etc., subject to ExParte 175 increase.

FREIGHT TRAFFIC COMMITTEE

TRUNK LINE TERRITORY RAILROADS

Docket TL M-2048 (Shipper)—Crushed stone (will not include agricultural limestone or ground limestone, unburned; fluxing stone; firestone; or stone coated with oil, tar, or asphaltum) carload minimum weight 90 percent of marked capacity of car, from Downington, Pa., to Philadelphia, Pa., 95 cents per net ton, subject to ExParte 175 increase, in lieu of current commodity rate of $1.46 per net ton.

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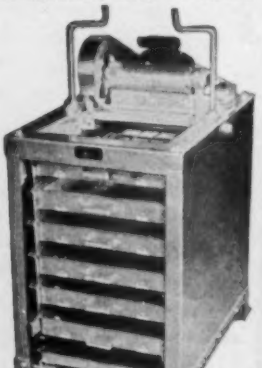
Mechanical Testing Screen

is the standard method for test-sizing samples of sand, crushed stone, etc. Fast and accurate—insures a uniform, controlled product. Makes 2 to 7 separations simultaneously. Range from 4" to 200-mesh. Write for details.



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MANGANESE STEEL
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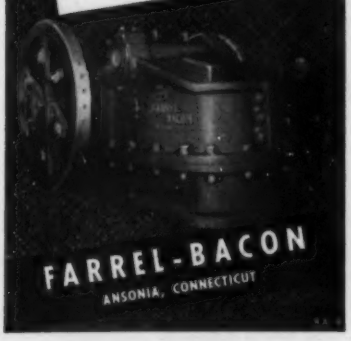
FARREL-BACON
JAW CRUSHERS
SIZES 60"x48" to 10"x7"

Optional design features include: (1) Meehanite frame, sectionalized when necessary; (2) removable water-cooled bearings; (3) improved design of swing-jaw bearing; (4) force-feed oil lubrication, or circulating system if desired; (5) split flywheels; (6) flat or V-belt drive. *Write for further details or engineering assistance.*



FARREL-BACON
ANSONIA, CONNECTICUT

Docket TL M-2057 (Shipper)—Proposed to establish on limestone, ground (except agricultural limestone or ground limestone for acid soil treatment), in bulk or in packages, carload minimum weight 50,000 lb., from Buchanan, Va., to Lecato, Va., $2.79 per net ton in open-top cars not protected by tarpaulin or other protective covering and $3.29 per net ton in closed cars or open-top cars protected by tarpaulin or other protective covering. Subject to ExParte 175 increases.

FREIGHT TRAFFIC COMMITTEE—TRUNK LINE TERRITORY RAILROADS

Docket TL M-2075—Proposed to establish rate on limestone, ground (except agricultural limestone or ground limestone for acid soil treatment), in closed cars or in open-top cars protected by tarpaulin or other protective covering, carload, in bulk or in packages, minimum weight 60,000 lb., from Buchanan, Va., to Lecato, Va., $2.79 per net ton subject to ExParte 175, in open-top cars not protected by tarpaulin or other protectitive covering, and $3.29 per net ton subject to ExParte 175 increase, in closed cars or open-top cars protected by tarpaulin or other protective covering.

WESTERN TRUNK LINE COMMITTEE

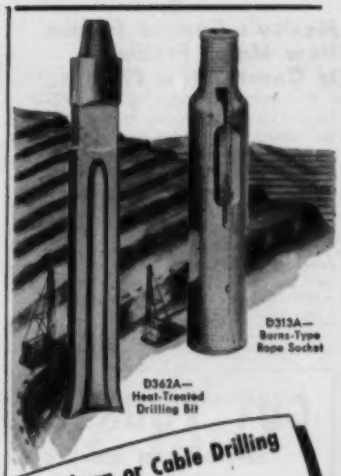
Docket E-41-1574 (S)—Proposed to establish rate of 453 cents per net ton, subject to X-175-A increase, on shipments of limestone, ground in barrels or sacks, carload minimum weight 60,000 lb., from Weeping Water, Neb., to stations in Colorado and Wyoming, shipments moving in open-top cars and 501 cents per net ton (subject to X-175-A increase) on shipments moving in closed cars or in open-top cars protected by tarpaulin or other protective covering.

Docket E-41-1577 (S)—Proposed to establish on rock, perlite, broken, crushed or ground, dried or not dried, not expanded, carload minimum weight marked capacity of car, but not less than 80,000 lb., Socorro, N. M., to Iowa City, Iowa, $7.52 per net ton of 2,000 lb. Subject to tariff X-175-B increase.

Docket E 41-1578—Proposed to establish a rate of 374 cents per net ton, subject to X-175-B increase, on sand (except sand, molding, bonded, naturally or otherwise, and ground or pulverized sand), in closed cars; also a rate of 401 cents per net ton, subject to X-175-B increase, on sand, ground or pulverized, in closed cars, from Pacific, Crystal City, Crystal Junction, Gray Summit, Hermann, and Sand Pit, Mo., to Louisville, Ky.

Docket X-E-41-1580 (C)—Proposed to to establish on sand and gravel, minimum weight 90 percent of marked capacity of car, but not less than 20 tons, from Janesville and Afton, Wis., South Beloit, Ill., and Edgerton, Wis., to Boscobel, Wis., $1.07 per ton, subject to X-175.

A unique life-saving role was played by a steam shovel recently in Wharton, N. J., when Kenneth Burd, operator of a big unit, used his mount to save a nine-year-old boy from death in a slag slide. The big scoop dug Raymond Nagy out of the slide while a second boy ran for help.



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Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

Mexico's Cement Famine Now Major Problem In Construction Picture

A scarcity of cement has appeared in Mexico almost overnight and has created the danger that construction, already slowed down, may be completely paralyzed. This situation has developed in spite of the fact that cement production in Mexico has increased 300 percent since 1937, according to the figures of Nacional Financiera, the semi-official government finance agency. Production has been running at the rate of 1,500,000 tons yearly, and a goal of 2,000,000 tons is hoped for this year, with another increase to reach 2,400,000 tons in 1953. This is expected to supply the Mexican construction industry adequately. The Mexican production of cement is now the fourth-largest of the American continent.

The shortage has been blamed on several factors. The charge has been made that the government, with its greatly accelerated public works program, is indirectly responsible. This has been admitted by the Department of Economy, which said, however, that the cement industry should have better distribution methods.

A logical reason advanced by the cement industry is that the rhythm of construction in the country has accelerated to such an extent that cement shortages are to be expected, and it is anticipated that the problem will remain for some time to come, unless production is raised. These views are shared by the National Chamber of the Cement Industry and the Construction Workers Union.

Antonio M. Baez, Secretary of National Economy, has unequivocally declared that there was no foundation to rumors that cement shortages and the resultant soaring prices were due to alleged heavy exports of cement. His department has issued an appeal to all cement users to get along with absolute minimums. In the meantime a commission appointed by the Department of Economy will undertake a broad study of the cement situation, especially with respect to deficiencies in some cement plants. Some manufacturers have been complaining of the lack of limestone and of low electric power supplies and power failures as affecting their production.

Official figures show that public works construction is consuming more than 40 percent of the national cement production. Investigation has also shown that contractors working on government projects have accumulated much larger stockpiles of cement than they require, and that this has amounted to a cornering of the available supply. Officials state that vigilance will be exerted in the future to see that contractors do not overpurchase cement supplies, so that these can be equitably distributed.

The increase of 30 percent in cement demands in March and April has been attributed to the vast public works program, the widespread building construction throughout the country, and the rushing of contractors to complete schedules before the start of the rainy season (June through October). The rainy season will curtail construction work considerably and thus give cement manufacturers a chance to catch up with demand.

The cost of constructing a cement plant has risen by about $6.97 per ton of daily capacity, as compared with previous figures. The high cost of constructing new cement plants and the modernization of those already established has had a retarding effect on the expansion of cement-making facilities except for a few heavily-financed units.

The official price on cement is $16.28 per ton at the plant and $18.60 when delivered to the site. Prices on the black market have ranged from $29 to $36 a ton, and may go higher.

The Independent Sand and Gravel Company, Newtown, O., has been purchased by the Southern Ohio Mining Corporation and County Concrete, Incorporated. Principals in the purchasing concerns were W. Russell Warner and R. B. W. Chatfield. John Fogle and Mrs. Anna Van Hook were principal former owners of the Independent Sand and Gravel Company.

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Continuous Type
(Style #8 shown)

Salem Type

When you are in need of replacement buckets for your elevator, check the money-saving advantages of using STANDARD buckets.

The rigid construction of STANDARD buckets insures a long, durable life for efficient operation. They are made of top-grade steel to resist abrasion, corrosion and hard usage.

We are equipped to furnish all types, styles, sizes and gauges of steel formed buckets.

Buckets that wear extensively on the leading edge may be had with a reinforcing strip securely plug welded to lip of bucket. Hard surface rod may also be added for longer life.

For standard designs or special buckets, send us your requirements and we will promptly quote price and delivery on any quantity desired.

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Skilled service in a well equipped shop, with low overhead, makes it possible to supply your special needs at low cost. Equipment reconditioned NOW will be ready for service to prevent COSTLY PRODUCTION DELAYS.

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Have you investigated our new
BRADLEY HERCULES MILL?
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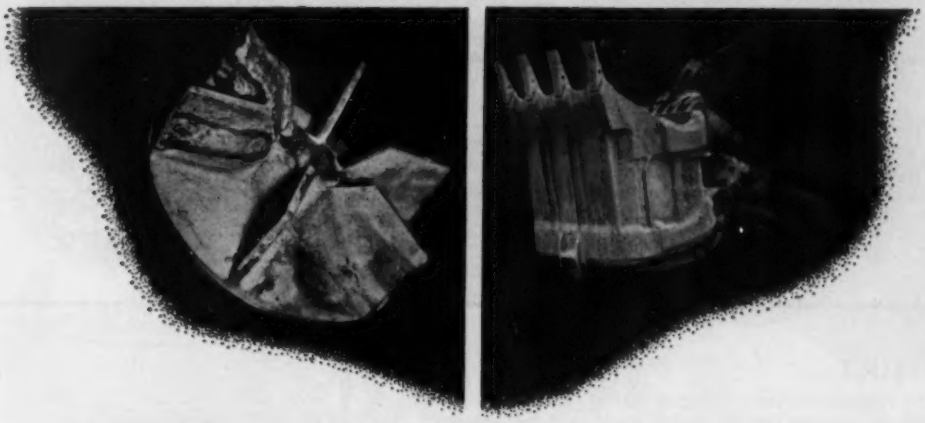

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AR-3

Pre-testing in Lab ELIMINATES GUESSWORK for Projected Process

PROBLEM...

A mining company wanted to know if lightweight aggregate could be produced profitably from material available in a company-owned shale deposit.

"Can a product be made that will meet commercial aggregate specifications?" And — "Will the process be commercially practical?" The customer wanted answers to these questions before going ahead with full-scale operations.

WHAT WAS DONE...

A sample from the shale deposit was sent to the Allis-Chalmers Process Research Laboratory. Tests in the Laboratory's 15-ft rotary kiln and gyratory crusher indicated that the product would meet the highest aggregate standards . . . and that the process would yield a healthy margin of profit.

RESULT...

This company was able to set up operations on a commercial scale with the *assurance* that the product would be readily salable . . . and with a complete knowledge of the costs involved.

A-3673

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Grinding
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Food, Chemical and Grain Processing
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The Laboratory's complete facilities for chemical and physical analysis have also been used profitably by hundreds of clients. All testing services include the technological skill of the Laboratory's personnel, who are guided by Allis-Chalmers invaluable experience in engineering equipment for industry.

Testing is done on a confidential basis. Charges are based on costs. Estimates for test work can be obtained from the A-C representative in your area or by writing Allis-Chalmers Research Laboratories, Milwaukee 1, Wis.

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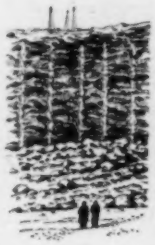
It was 1802... 150 years ago... when Eleuthère Irénée du Pont de Nemours began making black powder in a fieldstone mill along the banks of Brandywine Creek near Wilmington, Delaware.

Research... experimentation... even then held a place of high concern in the development of a product soon known for its superior quality. From that humble beginning, so significant of the way of life in this new country, research has constantly played an important part in the colorful history of the Du Pont Company.

ONE HUNDRED YEARS passed. In 1902 . . . now half a century removed . . . Du Pont established Eastern Laboratory at Gibbstown, New Jersey. It was one of the first in the United States to be entirely devoted to industrial research. Here, old products were improved; new ones developed and perfected. And as always, consumers, technical representatives and the laboratory's chemists, physicists and engineers cooperated in the work. The keynote was progress. Today, such research has become an indispensable, integral part of Du Pont's continuing program of product improvement. Laboratory facilities now embrace over 75 buildings, a proving ground of some 3600 acres and an experimental tunnel and mine.



MANY INDUSTRIES have benefited from these untiring efforts. In the field of quarrying alone, an imposing list of product developments contributed largely to the advancement of the industry. Men now long engaged in quarry operations may well recall the introduction of some of these. Younger men will recognize other, newer products of Du Pont Explosives Research. Among these contributions to a basic industry are the following:

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- Low-freezing dynamites
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- "Nitramon"
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- Blasting Timer
- Detect-A-Meter
- Primacord "MS" Connectors
- Primacord Boosters
- Condenser Discharge Blasting Machine

BUT what is new today may become obsolete tomorrow, next week or next year. That is why the job of research never ends. And constant research is why Du Pont Explosives have earned world-wide recognition. For 150 years they have met the specialized needs of the quarrying industries and of the men whose work requires dependable performance in a wide variety of products. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

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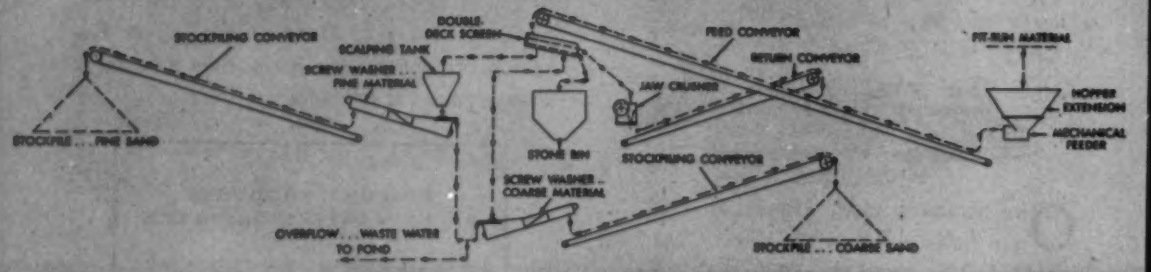
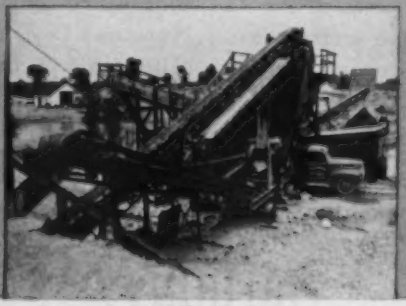


"Adding washing equipment to what was already a highly efficient crushing and screening plant has made my Austin-Western set-up DOUBLY SUCCESSFUL and PROFITABLE." *Edward Schneider, Elgin, Illinois*

Pit-run gravel is conveyed to a screen to which water has been piped, where stone already down to size is removed and spouted to the bin. Oversize goes to a jaw crusher, and from there is returned by conveyor to the screen, closing the circuit. Coarse sand is spouted to a screw washer where, through controlled water turbulence, the coarser, heavier material, washed clean, settles to the bottom and is taken out by the screw. The finer sand, together with silt and debris, is held in suspension, and goes with the water to a large settling tank where the sand settles to the bottom. Then, with some of the water, it goes to the final washer where the fine sand is again thoroughly cleaned. As it settles, it is taken out by screw conveyor. Washed material, from which silt, clay and vegetation have been removed, always brings TOP prices!

Whatever your requirement, there's an Austin-Western plant to meet it . . . a plant that means MORE ROCK for LESS MONEY. Why not talk things over with our engineering department?



Close-up of screw washer for coarse material | Return conveyor provides closed-circuit operation | View of settling tank and screw washer for fine mate

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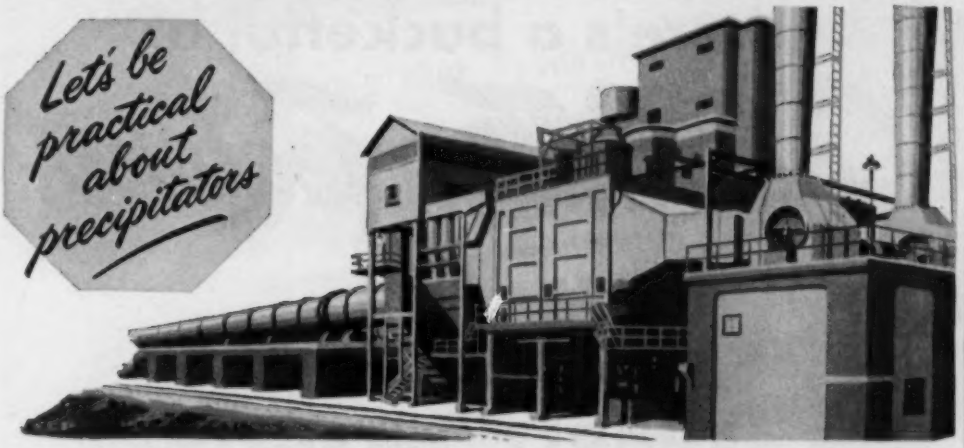
BALDWIN BLH LIMA-HAMILTON



A Koppers-Elex electrostatic precipitator like this one (shown on a cement dust application) can be your best investment in nuisance abatement. Inherent efficiency of the design is high enough to meet all present and proposed nuisance abatement requirements . . .

Here's what you can do *today* to meet more stringent nuisance abatement laws of the *future!*

IT'S ALMOST a foregone conclusion that nuisance abatement laws all over the country are going to be tightened up. That's one big reason why you should specify Koppers-Elex electrostatic precipitators. Koppers has proved designs right now which clean process gases down to .15 grain per cubic foot residual and less! And that performance is well within most existing or contemplated nuisance abatement requirements.

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20% TO 40% LIGHTER than other buckets, type for type.

14% MANGANESE STEEL CHAINS, fittings and reversible tooth points.

FULL PAYLOAD every trip—even in wet digging.

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EVERY DIGGING PURPOSE

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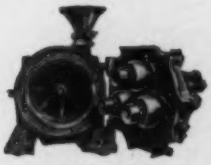
For separation of fines to 325 mesh and finer. Increases output from 25% to 300% . . . lowers power costs by 50%. For years, this separator has been the standard in the cement industry.

DUSTLESS BLENDER

Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for ¼ ton per hour and up.



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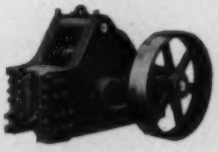
For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open-door accessibility. Many sizes. No scrapers, plows, pushers, or shields.

SWING-SLEDGE MILLS

For coarse and medium reduction (1" to 20 mesh). Open-door accessibility. Soft, moderately hard, tough or fibrous substances. Built in several types and many sizes.



JAW CRUSHERS

For coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

Sturtevant equipment, such as illustrated, helps you overcome high labor and production costs by increasing output. In addition, their rugged construction assures long life with minimum maintenance. It will pay you to investigate these machines. Write for information.

STURTEVANT MILL COMPANY

104 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of: CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

MAIL COUPON TODAY!

STURTEVANT MILL COMPANY
102 Clayton Street, Boston 22, Mass.

Gentlemen:
Please send me your catalog. I am especially interested in _____

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GM Diesel
Case History No. 519-18
USER: Becker & Tuckwood,
Lancaster, Wisconsin
INSTALLATION: GM 4-71 Diesel powering
Universal Model 1836 portable
jaw crusher, replaced gasoline engine
six years ago.
PERFORMANCE: Crusher produces 600
cu. yds. daily. Operates 6 days a
week. Owners report 10% to 15% higher
production with GM Diesel, and 40%
lower fuel costs. Engine overhauled
once in six years.

THIS DIESEL CRUSHES 600 YARDS A DAY

and cuts fuel costs 40%

GM
DIESEL
POWER

. . . "the rolls take a beating on this job!"

a report from

J. V. GLEASON

J.V. Gleason Co., Bituminous Contractors of St. Louis Park, Minn.

on their "66"

DIAMOND ROTOR-LIFT PLANT

BITUMINOUS SURFACING

J. V. GLEASON

5701 LOUISIANA AVENUE, ST. LOUIS PARK, MINNESOTA

DIAMOND IRON WORKS, INC.
1710 N. 2nd Street
Minneapolis 11, Minn.
Attn. C. E. Hanson, Vice President Charge of Sales

Dear Carl:

Direct from a year's operation in a state pit located near Lonsdale in Southern Minnesota, our Diamond "66" has yet to see downtime, through parts failure! Now it is crushing a steady 150 y.p.h. of 25% crush specification material at a site where the going is heavy and the strain is really on the 30" x 18" roll crusher. And we have seen no downtime yet. The plant's 10" x 36" jaw crusher and 4' x 10' — 2 deck vibrator screen are helping to keep our "66" producing day after day.

We'll stick with Diamond plants for a lot of reasons, the chief being that they can take it when the going is rough.

Very sincerely yours,
J. V. Gleason, Owner

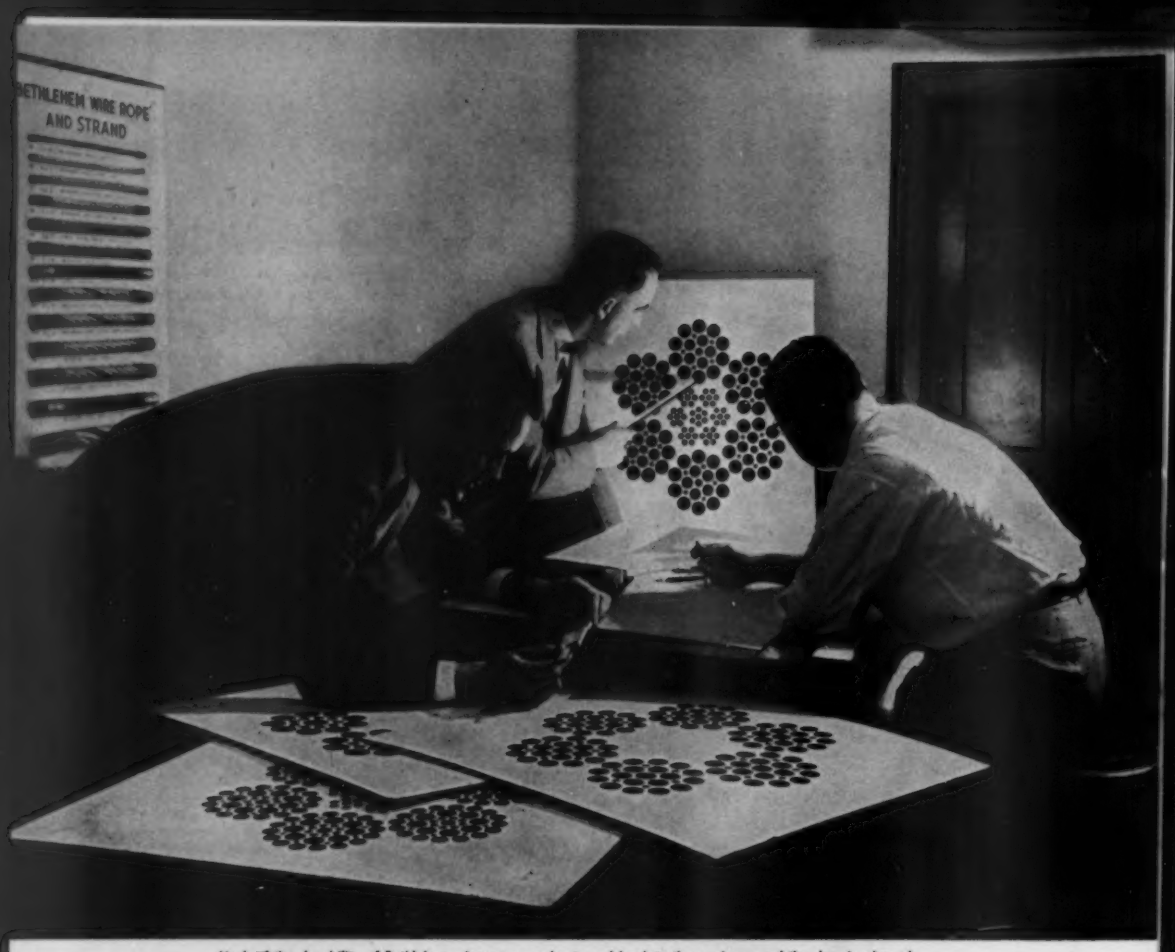
ABOVE: Loading pit-run at 150 y.p.h. Power unit installed over delivery conveyor need not be removed when on road.

BELOW: Dumping pit-run into Diamond shovel-loading hopper. A Diamond grizzly and single eccentric plate feeder keep a continuous, regulated feed.

Everything . . . for the aggregate producer

DIAMOND

DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING CO. DIV.
1756 N. 2ND STREET, MINNEAPOLIS 11, MINNESOTA



Much of the durability of Bethlehem wire rope can be traced back to the engineer and the drawing-board.

So that your Wire Rope will serve you well

These engineers are engaged in a typical discussion of the product they live with—Bethlehem wire rope. They know the tremendous importance of good design, good engineering . . . and they will spend many hours, sometimes days, over a seemingly small point that they feel will improve the quality of Bethlehem rope.

The making of wire rope is more than a matter of drawing wire and laying wires and strands into intricate patterns. Wire rope starts in the minds of engineers, and at Bethlehem these minds are busy ones.

When you rig with Bethlehem rope, you can be sure that the rope has been well designed, well engineered . . . and that every subsequent step has received the same degree of care.

This care pays off on the job, where Bethlehem rope will serve you well. You can depend upon every foot, every inch of it, no matter how tough the going.

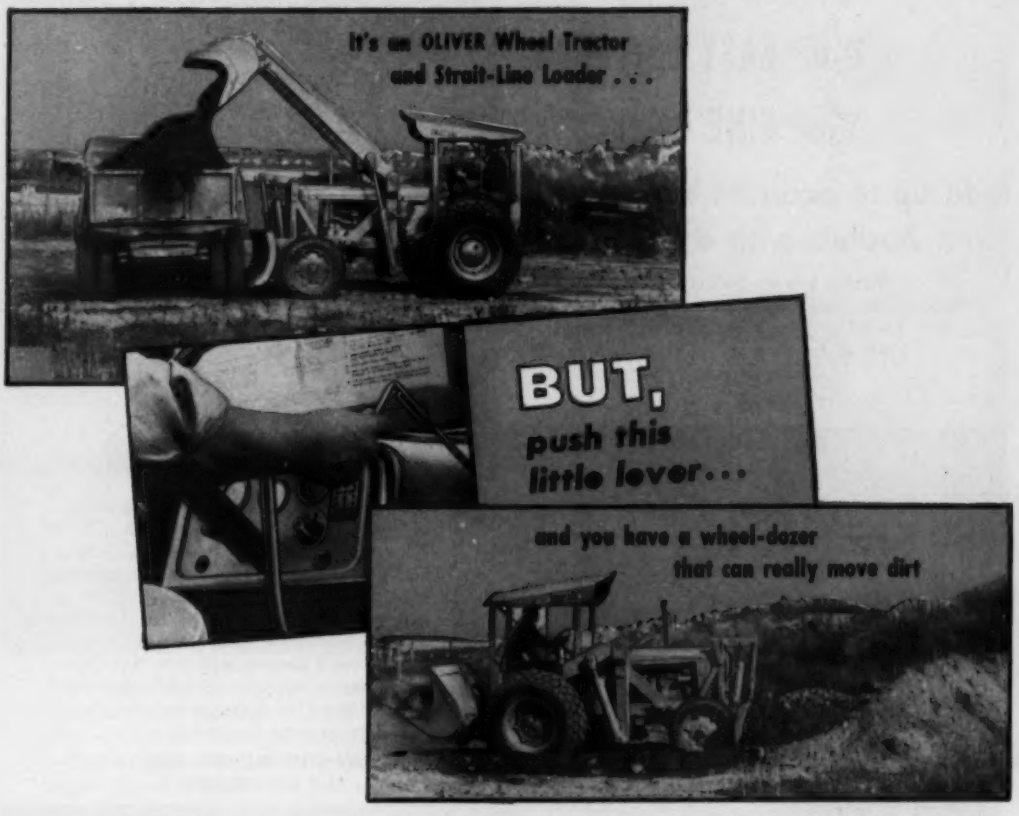
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

"Quick Change Artist"

...that saves *Your* time and money!


It's an OLIVER Wheel Tractor and Strait-Line Loader . . .
BUT, push this little lever . . .
and you have a wheel-dozer that can really move dirt

Now, it's an Oliver Wheel Tractor and *Strait-Line* Loader. But, push a little lever and *presto* . . . it's the most amazing bulldozer or angledozer you've ever seen.

You undoubtedly know the advantages of the Strait-Line Loader . . . the loader that digs in back, swings its load overhead, and loads in front. You know that the rear-carried bucket load multiplies traction . . . makes steering easy.

But now, you can get a "quick change" bulldozer and angledozer blade for the Strait-Line. Just push the little lever and, quick as a flash, you switch from loading to dozing. Pull the lever . . . you're ready for loading. Remember, by carrying the loaded bucket in the rear, you get unparalleled traction that puts real "push" behind the blade. It makes wheel tractor dozing a reality! You can load trucks without dismounting the blade.

For informative literature see your Oliver Industrial Distributor or mail the coupon.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Ave., Cleveland 17, Ohio

A complete line of industrial wheel and crawler tractors

The OLIVER Corporation, Industrial Division
19300 Euclid Ave., Cleveland 17, Ohio

☐ Send me literature on "Quick Change" Bulldozer-Angledozer for Strait-Line Loaders.

☐ Name and address of my Oliver Industrial Distributor.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

SNAPPY swing
QUICK control
EASY operation
FINE balance

add up to accurate spotting of buckets with a BAY CITY

Whether you are loading bins and trucks or dumping on a spoil bank, the balanced design and easy flow of power of a BAY CITY will speed your materials handling and excavating operations . . . increase your profit possibilities.

With shovel, dragline or clamshell, the snappy swing, quick control, easy operation and fine balance of a BAY CITY make it easy to spot the bucket accurately and speed the digging cycle. No single factor makes the BAY CITY so long-wearing . . . so long lasting. It is a combination of heavy-duty design, construction and operating features which have made so many BAY CITY owners *repeat buyers* for up to 35 years. See your BAY CITY dealer for the full story or write today for catalog.

BAY CITY SHOVELS, INC.
BAY CITY, MICHIGAN

CHECK THESE FEATURES

- √ Fully Convertible
- √ Long, Wide Crawlers
- √ Alloy Cast Bases
- √ Tandem Drums
- √ Power Booster Clutches
- √ High Line Speeds
- √ Wide Vision Cab
- √ Pin-Connected Boom

209

Power booster clutches—single adjustment ▶

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

Economical delivery of large tonnages over short or long distances—from one operation to another if need be (see photo above)—that's the function of the Jeffrey Belt Conveyor. You can depend on Jeffrey Belt Idlers to carry the load. They are built to take severe punishment year after year—roller or ball-bearing troughing or return types. A Jeffrey-engineered material handling system means the best in mechanical efficiency—the best method of doing your particular job, providing economy and long life in the equipment recommended. May we be of service to you?

A LOOK AT THESE MAY HELP: Bin Valves • Bucket Elevators • Chains • Conveyors • Coolers • Car Pullers Crushers • Dryers • Feeders • Idlers (Belt) • Pulverizers • Screens • Packers • Sprockets • Weigh-Feeders Transmission Machinery • • • • *LITERATURE ON REQUEST*

JEFFREY

MANUFACTURING COMPANY

1877 75 1952

This Lippmann GRIZZLY KING Jaw Crusher at Alabama Aggregate Company, Pelham, Alabama, has crushed 1,200,000 tons of tough Blue Ridge rock since it was installed. Discharge opening is 5 inches. The management reports that this tremendous output has been attained without interruptions — that the reversible jaw dies have not been touched, not even reversed.

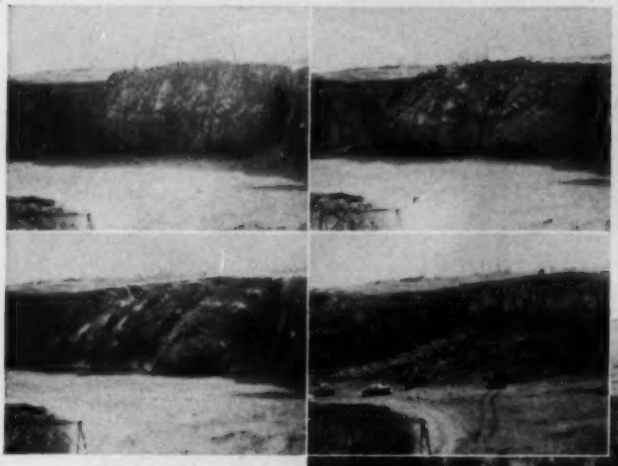
No other jaw crusher can match GRIZZLY KING'S capacity and performance. Extra-long curved and reversible jaw dies, engineered crushing action with alloy steel frame and jaw add up to the rock-eatingest crusher on the market today. The GRIZZLY KING is the world's highest capacity overhead eccentric jaw crusher and is available in sizes up to 36" x 48" opening.

Other Lippmann equipment at Alabama Aggregate includes an apron feeder and discharge belt conveyor with Lippmann Life-Sealed Ball Bearing Idlers. Leading operators the world over choose Lippmann for their crushing, screening and washing plants both stationary and portable. It will pay *you* to do so too. Lippmann Engineering Works, 4607 W. Mitchell St., Milwaukee 14, Wisconsin.

BLASTING CLUES from the ATLAS MACHINE-GUN CAMERA

What Kind of Pile Faces Your Shovel?

Here's how alternate milli-second delay shooting can pile well-broken rock away from the face!



Photos at North Jersey Quarry Co., Millington, N.J.

Here you see a ROCKMASTER® alternate milli-second delay blast in action. The first picture was snapped by the machine-gun camera ½ second after the blast was initiated: bulging face already gives evidence of excellent breakage. The second photo shows the peak of the blast with the rock moving out from the face. In the third photo you can see the rock piling up on the quarry floor. Final photo shows the well-broken rock lying away from the face at about the height of the shovel boom—where it can be handled safely and efficiently . . . where it will cost the least to move.

Here's a close-up of a well-shot rock pile—the end result of a ROCKMASTER alternate milli-second delay blast. Note particularly the ridge of the pile indicated by the arrow and dotted line—see how the rock was piled *away* from the face. This is the kind of control over throw that only ROCKMASTER blasting can give.

ROCKMASTER Blasting is *controlled* blasting. See how it can work for *you*. Send for free 16-page book *"Quarry Blasting the* ROCKMASTER *Way"*—it illustrates milli-second delay methods with machine-gun camera photos.

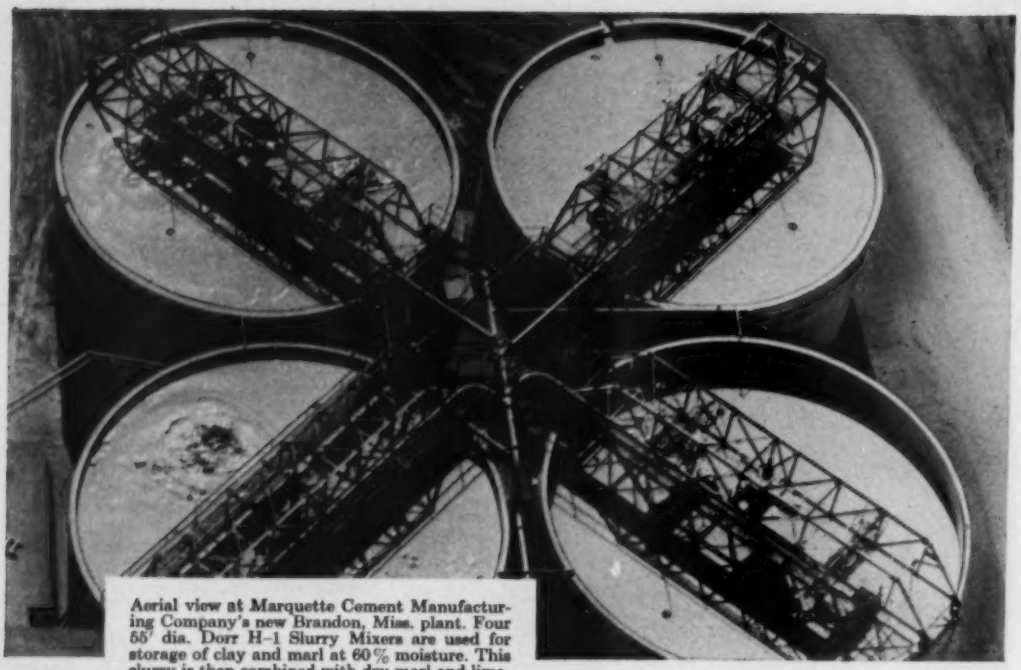
ATLAS EXPLOSIVES

ATLAS

"Everything for Blasting"

ATLAS POWDER COMPANY • WILMINGTON 99, DELAWARE

Offices in principal cities



Aerial view at Marquette Cement Manufacturing Company's new Brandon, Miss. plant. Four 55′ dia. Dorr H–1 Slurry Mixers are used for storage of clay and marl at 60% moisture. This slurry is then combined with dry marl and limestone to produce a kiln feed at 45% moisture which is stored in two similar units.

for your **BIG** *cement slurry storage job...*

You can't beat the Dorr Type H Slurry Mixer... today's best answer to the problem of large volume kiln feed storage for wet-process cement production.

First, it is powered by the Type H drive from which it takes its name . . . a rugged power-package incorporating balanced spur gears and extra-heavy duty construction.

Second, it utilizes a center shaft mechanism with the drive head supported by a truss spanning the tank. Requires no center pier and foundation . . . saves concrete and reinforcing steel . . . greatly simplifies the construction of deep tanks for cement slurry mixing. In short . . . saves dollars for you.

Add to these features the thoroughly proven mixing control effected through the rake and air lift principle of the Dorr Slurry Mixer. The result is the best possible slurry storage unit in the 45′ to 70′ dia. range . . . at a reasonable installed cost. For more detailed information write to The Dorr Company, Stamford, Conn., or in Canada, The Dorr Company, 80 Richmond Street, West, Toronto 1.

Better tools TODAY to meet tomorrow's demand

DORRCO

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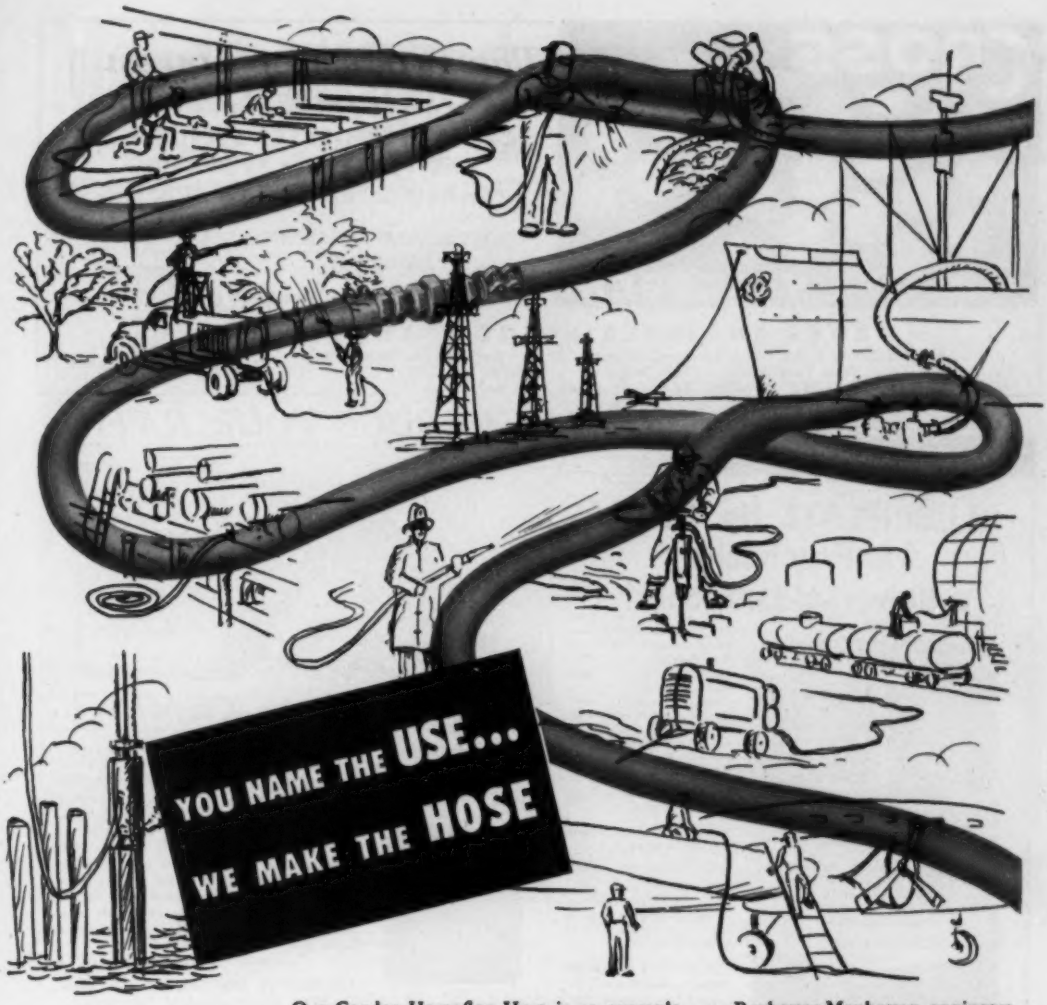

Our Condor Homoflex Hose is an example . . . Raybestos-Manhattan engineers found a way to build strength into a hose-wall without simply adding weight and thickness in more plies. The result, this Hose is flexible as a rope . . . and a real labor saver wherever men must constantly work with hose. On the other hand, Raybestos-Manhattan makes the world's *largest* and *heaviest* hose for oil drilling and loading, and for suction • Hose may not be your problem today, but whenever you think of industrial rubber products . . . transmission, conveyor, V-belts, or hose . . . remember R/M engineers have developed exclusive features to give you more for your money in every use. Consult your R/M representative.

RM

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RAYBESTOS-MANHATTAN, INC.

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"CROSS" PERFORATED STEEL SHEETS AND PLATES for *VIBRATING *SHAKING *REVOLVING SCREENS

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1. **LUBRIPLATE** reduces friction and wear
2. **LUBRIPLATE** prevents rust and corrosion
3. **LUBRIPLATE** is economical to use

Write today for case histories of savings made through the use of LUBRIPLATE in your industry.

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Fiske Brothers Refining Co.
Newark 5, N.J. Toledo 5, Ohio

The Different LUBRICANT!

DEALERS EVERYWHERE, consult your Classified Telephone Book

REDUCE YOUR RATIO

OF FUEL-to-CEMENT

In these days of increasing fuel and labor costs, every economy you can make is important. Here is a sure way to SAVE FUEL. Cambridge Gas Analyzers will provide the Burner with a continuous and simultaneous record of the oxygen, carbon dioxide, and combustibles in the flue gas. O_2 analysis serves to warn against excessive air supply; combustibles analysis indicates oxygen demand under all conditions; CO_2 analysis reflects state of calcining process. Cambridge instruments make uniform kiln operations possible with ease. Savings effected pay for installation in short time.

Send for literature

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CAMBRIDGE GAS ANALYZERS

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

New Records in Gravel Reduction... RELIANCE Jaw Crusher

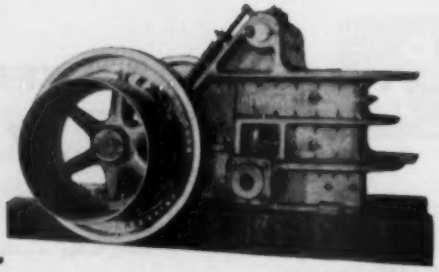
Chalk up top output and profit figures by single pass reduction of gravel with a RELIANCE Jaw Crusher.

RELIANCE Crushers are especially suited for this job—featuring rugged all-steel construction, low and large receiving openings, and long deep jaws for sure gripping and crushing. Jaws adjustable for fine or coarse product.

Fitted with Alemite high-pressure lubrication, smooth-running RELIANCE Jaw Crushers insure long, continuous service life and low-cost maintenance.

Write for Catalog No. 48, describing the RELIANCE complete line of sand and gravel washing and handling equipment.

UNIVERSAL ROAD MACHINERY CO., Kingston, N. Y.

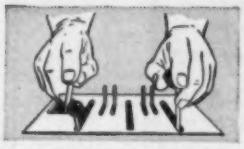


Makes rugged rock work easy

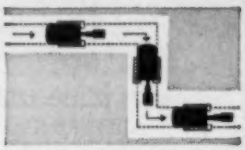
K-370 with power hydraulic controls packs extra power and stamina

ROCKWOOD SLAG PRODUCTS, INC., Rockwood, Tenn., move over 25,000 tons of rock and 5,000 tons of slag per month with their Link-Belt Speeder 1¾-yd. K-370. Operator Harold Boring says, "I don't believe there's a better rig made." Operator A. L. Long adds, "It's the finest operating machine I've ever been on."

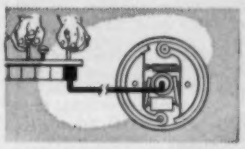
Here are Link-Belt Speeder PLUS FEATURES that work for you



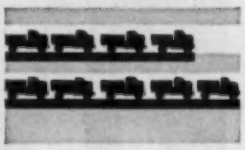
Speed-o-Matic Controls — fully hydraulic! You "feel" the load all the way. Simple, easy—fingers instead of muscles do work.



Turns on a Dime. Either track can drive or be locked independently. Hydraulic control gives instant response.



Speed-o-Matic Clutch, hydraulically actuated, simple, smoothly responsive. Runs cool. Eliminates need for frequent adjustments.



Up to 25% more production — fast operating cycle steps up output and profits. Effortless control keeps operator fatigue down.

LINK-BELT SPEEDER
CORPORATION
12,900

Builders of the most complete line of shovels, cranes and draglines

CEDAR RAPIDS, IOWA

THERE'S MORE THAN MEETS THE EYE IN

Photo shows "tubes" coming off large tuber, from which they are conveyed to sewing machines, where they are made into Sewn Type Multi-Walls.

★ HIGHEST QUALITY PAPERS AND MATERIALS

★ MODERN MACHINES—SKILLED PERSONNEL

★ EFFICIENT PLANT OPERATIONS

HAMMOND Multi-Wall BAGS

Satisfied customers in the cement and rock products industries know that all multi-wall bags are not alike. The combined efforts of progressive management, conscientious and thoroughly trained personnel, and expert sales engineers who thoroughly understand the problems of shipping hundreds of products—are the primary reasons for the superiority of Hammond Multi-Wall Bags. *Write for booklet—"To Serve You Better with Hammond Multi-Wall Bags."*

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POSITIVE AUTOMATIC

YOU DON'T HAVE TO
KICK THE BUCKET
TO CLEAR IT—IF IT'S AN
M-T-MATIC

Irresistible leverage sweeps out SAND—COAL—GRAVEL, or any granular materials, on every trip—*even if frozen or close-packed.* The secret is the separately mounted stripper-plate—which must push up and out when it starts over pulley radius. THOUSANDS NOW IN USE—handling *more* material at same or faster belt speeds. Saves belts—cuts maintenance—easy to install on any elevator conveyor—all sizes.

Standard buckets also available . .

★ Send for prices today (give present bucket size)

QUICK DELIVERY!

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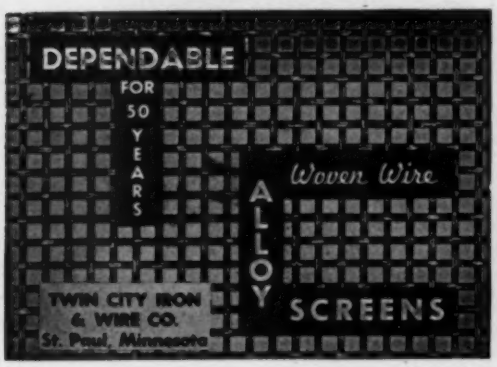

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Here is the latest development in the scale and weight printing fields! The Howe Teleprint is available for use with Howe Tape-Drive Dials for Motor Truck Scales. It will record weights on a wide variety of tickets, forms, tapes, and can be located up to 1,000 feet from the scale.

For further information about this most important contribution to increased weighing accuracy — Write for descriptive folder — Teleprint Form No. 681, Dept. PQ-7.

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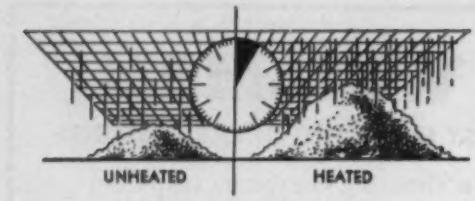
The HOWE SCALE Co.
RUTLAND, VERMONT



FASTER screening
LONGER screen life
plus

QUICK, EASY SCREEN CHANGES!

You can electrically heat screens to
—speed screening of moist materials
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without the difficulties formerly encountered when changing and replacing screens on heated installations.

Hannon, pioneer in screen heating, now offers a *new Quick-Change Attachment* that makes cloth changes as easy as they are on unheated screens.

Copper conductor bars are shielded from abrasive material and make positive, direct contact with cloth, eliminating current loss suffered when skirtboard is used to carry current (see detail below).

Less insulation is used; less maintenance is required.

A model is available for use with both stainless and tempered steel cloth.

Write for bulletin 521

F. R. HANNON & SONS
Engineers • Since 1926 • Manufacturers
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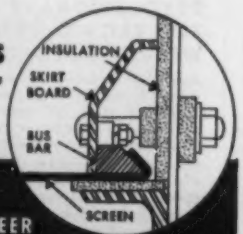

Hanco
THE PIONEER
ELECTRIC SCREEN HEATER

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Across the country, this same 'Incor'* economy attribute is now serving in defense construction of all types . . . saving critically short materials...saving time and money, too.

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Architect: **ROY F. FRANCE & SON**

Contractor: **TAYLOR CONSTRUCTION COMPANY**

'Incor' 24-Hour Cement from:
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SAFETY IS GOOD BUSINESS

ONE of the easiest tasks we know of is to give lip service to the cause of safety. It's like endorsing the Ten Commandments, or conceding that the Bill of Rights is an important milestone in man's unending struggle for freedom, or agreeing that babies, by and large, are pretty cute, or any one of a vast number of similar approvals which may be voiced without thought or hesitation. In a superficial sense, at least, everybody is in favor of safety, and is quick to agree that accident prevention is a fine, up-standing cause, fully deserving of the unstinting support of all men of good will.

Actually we believe that the cause is more hindered than helped by virtue of falling so self-evidently into the category of ideas which no sane man would dream of opposing openly. It is much *too* easy to endorse the idea of safety, and in so doing to experience a pious and wholly misleading sense of "Well, now, that's taken care of." Perhaps if it required some really serious soul searching to determine just where we stand on safety, more of us would graduate from the crowded ranks of mere endorsers to the relatively thin ranks of those who actually work for the cause.

Although we have almost no data at all with which to support our contention, we strongly suspect that in the concrete industries there exists an exceptionally high ratio of mere endorsers to actual workers in the cause of safety. One reason for this belief is the disappointingly small response to organized safety competitions within the industries. We would judge that an absolute minimum interest in safety would compel *all* producers to take part in such competitions, and that repeated failure or refusal to participate can only be construed as evidence of complete indifference.

It is hard to understand how any businessman can for long remain indifferent to a problem which affects his business so directly and so unfailingly and in so many ways as does safety. The morale, efficiency, all-around performance and loyalty of his employees are certainly at stake; the standing of his company with its customers and with the community in which it operates are vitally affected; and sooner or later the financial soundness of his entire enterprise becomes intimately involved.

A sound, far-sighted safety program is surely as important an adjunct of modern business as is a sound, far-sighted sales program. We urge those of our readers who doubt this (and we believe there are many who honestly do have doubts on the subject), to read the article which starts on page 269 of this issue. It tells how one concern, the W. E. Anderson Sons Company of Columbus, Ohio, went about the task of developing an intelligent, hard-hitting safety program, and how in little more than four years that program has been made to pay handsome dividends in every facet of the company's business.

We believe the Anderson story strikes a telling blow at the dated notion that an investment in safety is a laudable but wholly voluntary gesture somehow akin to making a donation to charity. For those who still require convincing, we believe it offers abundant evidence that safety is simply and overpoweringly a matter of good business.

William M. Avery

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news of the concrete industries

Texas Block Association Elects New Officers At 4th Annual Meeting

The Texas Concrete Masonry Association recently held its fourth annual meeting at the Roosevelt Hotel in Waco. Officers elected included the following: Vernon Cole, Texas Concrete Works, Waco, president; Lewis Lloyd, Alatex Construction Service, Inc., Houston, vice-president; and W. F. Smith, Black-Brollier, Inc., Houston, secretary-treasurer.

Chosen to serve as directors were A. J. Clark, Texas Industries, Inc., Dallas; R. P. Brown, Texas Concrete Block Company, Lubbock; Harry Franks, Atlas Building Products Company, El Paso; and C. T. Crowe, Crowe-Gulde Company, Amarillo.

Universal Concrete Pipe Co. Opens Plant at Jessups, Md.

The Universal Concrete Pipe Company has opened a plant at Jessups, Md., 12 miles southwest of Baltimore.

Complete equipment for producing 6- to 72-in. pipe has been sent from Universal's machinery division at Columbus, Ohio. A casting yard has been established on the 13-acre site for making pipe of larger diameter and longer length.

In addition to round sewer and culvert pipe, the Jessups plant will handle flat-base pipe for pedestrian and cattle passes, special pipe for utility galleries and manholes, reinforced concrete river weights, and open and closed-face concrete cribbing.

Harold Leuliette, manager of the Universal plant at Norristown, Pa., has charge of the new Maryland operation. Frank Bartrug is the production manager, and Henry W. Gadde is sales representative.

Concrete Masonry Proves Merit in Waterfront Fire

Concrete masonry walls scored again, this time in Honolulu, during a fire which recently destroyed much property along the Kewalo basin waterfront. According to Herb Moniz of the Honolulu Construction & Draying Company, Ltd., it was a concrete masonry wall that kept the fire from spreading and causing greater losses throughout a wide area.

Constructed of products made by the Honolulu Construction & Draying Company, the wall was in the direct path of the fire, which fortunately it resisted, saving most of the buildings in the vicinity from destruction. Mr. Moniz thinks that concrete masonry has presented an irrefutable argument to local property owners who will rebuild in this area.

Reinhold Is Honorary Member Of Canadian Products Assn.

According to word from W. C. Coupland, president of the National Concrete Products Association (Canada), Fred W. Reinhold of Anchor Concrete Products, Buffalo, N. Y., was elected an honorary member of the Association at a regional meeting of its executive officers held in Toronto on May 31.

Mr. Reinhold is a past president of the National Concrete Masonry Association (United States).

O. H. Seeger, president of the Columbus Concrete Block Manufacturers Association, Columbus, O., recently participated in a symposium on airfield pavement for jet aircraft sponsored by the Navy Bureau of Aeronautics at the Naval Engineering and Evaluating Laboratory near Oxnard, Calif. Mr. Seeger attended the conference at the invitation of the Sunnyhill Aggregate Corporation, New Lexington, Ohio, makers of Litestone.

YOU MAY BE NEXT!

A man who calls himself Thomas Ryan is defrauding operators of non-metallic minerals plants by representing himself as a subscription salesman for this publication. One of the victims describes him as follows: around 45 years of age, 5 ft. 7 in. in height, weight about 130 lb., florid complexion, teeth and fingers of right hand badly stained with tobacco, lower teeth widely spaced.

If a man answering this general description calls on you for the purpose of selling or renewing a subscription to Pit and Quarry, please notify local police at once and advise this publication's home office by collect telegram or long-distance telephone.—The Editors.

Detroit Products Assn. Puts Up $3,250 for Prizes In Home Design Contest

In a contest sponsored by the Michigan Society of Architects, the Concrete Products Association of Detroit is providing $3,250 to be awarded for prize-winning designs for small concrete masonry homes.

According to C. A. Sirrine, executive secretary of the Association, the competition was opened to any architect, draftsman, or student of architecture practicing, employed, or studying in Michigan, who is a *bona fide* resident of the state.

Winner of the first prize will receive $1,000; second prize, $750; third prize, $500; and honorable mention (10), $100 each. The contest closes on July 15, and the 13 prize winners will be announced at the midsummer conference of the Michigan Society of Architects on Mackinac Island, July 31, August 1 and 2. The first public showing in Detroit will be about September 1.

S. California Products Men To Publish Assn. Journal

Concrete Masonry Review is the name of a new publication to be issued by the Concrete Masonry Manufacturers Association of Southern California. The first issue, tentatively scheduled for July, will be circulated among architects, engineers, and building prospects generally to promote and extend the use of concrete units.

The new publication will feature pictures to a great extent, many being supplied by the membership.

General meetings of the association will be recessed during the summer months, the final meeting before the recess taking place the last week in June at the Glenn Switzer home in Pasadena. This was a special "ladies' night" and swimming party featuring an outdoor barbecue. W. P. Markert, director of promotion of the National Concrete Masonry Association at Chicago, was guest speaker.

Robert H. Parrish, who represented the Raymond Concrete Pile Company in Bogota, Colombia, from 1937 to 1941, died unexpectedly in that city on April 22. Mr. Parrish was stricken with a cerebral hemorrhage and died within a few hours. He was 57 years old.

• In a test sponsored recently by the Cement and Concrete Association and the Pre-Stressed Concrete Development Group (of England), a pre-stressed concrete footbridge was destroyed by lowering pig iron ingots on it. The picture shows the 76-ft. span of the 284-ft. bridge collapsing under the weight of 85 long tons. Deflection gauges measured the amount of sagging. The bridge was a left-over from the Festival of Britain last year.

1952 Eschenbrenner Awards Go to C. R. Burke, L. W. Seaman

Charles R. Burke, a senior in the engineering school at the University of Florida, and Laurie W. Seaman, an engineering senior at Swarthmore College, have been named winners of the 1952 Eschenbrenner Awards sponsored by Universal Concrete Pipe Company, Columbus, Ohio. Each will receive $500 and an engraved medallion.

The Eschenbrenner Awards were established in 1950 "to stimulate original thinking among civil engineering students in the design, fabrication, and use of concrete products".

R. G. Evans Co. to Distribute Masonry Sawing Devices

Robert G. Evans, one of the founders of the Clipper Manufacturing Company, has announced the formation of a company to distribute masonry and concrete sawing equipment.

Products will be marketed under the tradename "Target". Deliveries on diamond blades are immediate for masonry and concrete saws, as well as for small-diameter blades for power hand saws.

"Target" blades will use a new system to identify blade specifications for different materials. In place of symbols, color will be used. "Target" gold blades are for hard materials, blue blades for medium, and red blades for soft or abrasive products.

Headquarters for the Robert G. Evans Company will be at 6315 Brookside Plaza, Kansas City, Mo.

Central Culvert Corp. Sold To Texas Industries, Inc.

Texas Industries, Inc., Dallas, Texas, parent company of Texcrete of Shreveport, announced (May 19, 1952) the purchase of the Central Culvert Corporation of Shreveport, Monroe, and Alexandria, La.

Leslie D. Fain, vice-president and general manager of Louisiana Lightweight Aggregates, Inc., was named vice-president and general manager of the newly-purchased property.

Franklin F. Denton has accepted the position of plant manager of the Peyton Concrete Products Company, Benton, Ill. As a civil engineer Mr. Denton formerly served in the engineering department of the Illinois Central Railroad.

Richard V. Gustavel, co-owner of Frankfort Transit-Mix Concrete, Inc., Frankfort, Ind., has been elected president of that city's Chamber of Commerce.

Okay Upping Ready-Mix Prices for Out-of-Area Sand, Gravel, and Stone

Effective June 23, Amendment 1, SR 66, General Ceiling Price Regulation was issued by the Office of Price Stabilization to permit ready-mixed-concrete producers and building material dealers to add to their ceiling prices the increased costs resulting from necessary out-of-area purchases of sand, gravel, and crushed stone.

The original supplementary regulation, which became effective on October 2, 1951, permitted producers of ready-mixed concrete to make ceiling price adjustments when they were required to obtain cement from out-of-area sources, and the amendment merely extends the provisions of that regulation to apply to sand, gravel, and crushed stone.

Marietta Concrete Corp. Wins Wall Panel Contract

Contracts for 560,000 sq. ft. of precast concrete wall panels have been awarded to the Marietta Concrete Corporation in Marietta, Ohio, by the Electro Metallurgical Division of the Union Carbide & Carbon Corporation for its $100,000,000 plant expansion program in that city.

These panels are utilized to substitute for 12-in. thick brick masonry, and are said to cost one-third less. In addition to saving floor space—the panels are only 5 in. thick—the panels are said to provide insulation superior to that of a thicker brick wall.

Cutler D. Perry, 66 years of age, president of Troy Slag Products Co., Troy, N. Y., died on April 10 at his home in nearby Menanda.

• Members of the Detroit Concrete Products Association, an organization which now represents a number of concerns throughout the state of Michigan, held their June meeting at Alpena, home city of the Besser Manufacturing Co., and of the Huron Portland Cement Co. Members of the group, their wives, and officials of the Besser Company were photographed during an inspection tour of the Ella White elementary school, a modern exposed concrete masonry structure completed several months ago. Other highlights of the 3-day meeting included visits to the Besser plant and to the huge cement mill which Huron operates at Alpena.

Progressive Labor-Management Setup Pays Off in Bowden Products Plant

By WALTER E. TRAUFFER

ON THE SPOT

USUALLY when a concrete block operation is written up in these pages it is because of a new and modern plant, because an outstanding production or selling job is being done, or for some similar reason. It was the good fortune of this writer recently to visit an operation which fits into all these categories, but which is of even greater interest to other producers because of the outstanding labor relations job that is being done. The plant is that of Bowden Concrete Products at 2175 Person Ave., Memphis, Tenn., owned by James E. Bowden. He is ably aided by H. Wyninegar, general manager, and E. L. Baker, plant superintendent.

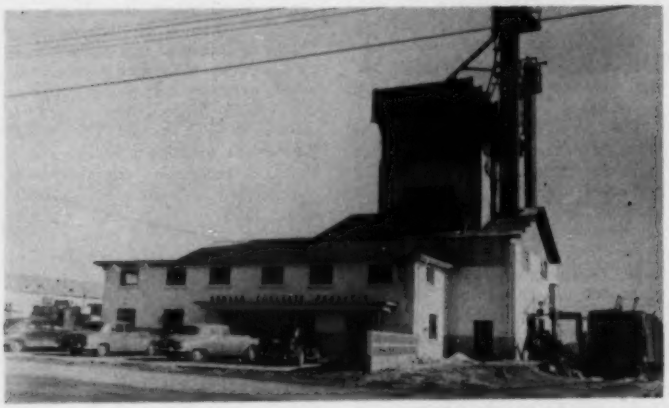
Mr. Bowden graduated from Mississippi State in 1940 as an agricultural engineer and later worked as a county agent. In November, 1941, he entered the armed forces, ending his career as a captain in the Air Corps, with flying service throughout the Pacific, including the Philippines, Okinawa, and Japan. Toward the end of the war he contracted a tropical disease. While he was in a hospital in Manila, he got the idea of entering the construction field from another patient who had been in that business and was enthusiastic about its future. He wrote at once to his wife at home in Memphis, who obtained all available information on the concrete block business and sent it to him. Later he was transferred to a Memphis hospital, and on occasional leave he supervised the construction of a small block plant which his wife managed until he received his final discharge in June, 1945.

Mr. Bowden had little cash to start with, so he began on a small scale with a hand-operated block machine having a capacity of 100 blocks per hour. As demand increased, a second hand-operated machine and later a small automatic machine were added. Demand still increased, and in May, 1948, a Besser Super Vibrapac replaced the other machines. In March, 1951, this machine was replaced by a later model Super Vibrapac with the latest refinements. At the same time a 400-ton Heltzel bin and batcher setup was installed. Earlier a Campion-Detroit accelerator replaced the old original boiler, and many other improvements were made. The plant now has a capacity of 800 blocks per hour, ten times the original figure, but there has been no relaxation of the high quality standards set by Mr. Bowden Concrete brick, posts, flagstones, and house supports are also made.

The real feature of this operation, however, is the excellent employer-employee relationship. The company has never had labor trouble and has built up a loyal, hard-working force which takes a personal interest in turning out good blocks in large quantities and at the lowest possible cost. The labor turnover is almost nil, 80 percent of the employees having been with the company since it started, and each month has seen a new record of production. One of the first things Mr. Bowden did after he got production and sales well under way was to set up a profit-sharing plan in which every employee shared after 12 months of service. Each year he distributes to the employees a certain set percentage of the preceding year's net profits, apportioned on a percentage basis to both plant and office help. No better inducement could be found to make each worker take a personal interest in the company's affairs and to help it prosper. Mr. Bowden feels that the company's success is due to the employees, and that they are entitled to a large share of its profits.

Steps taken for the welfare of the employees do not end there. Mr. Bowden is building duplex houses for all the employees, both white and colored, who have been with the company over a year. These are, of course, concrete block structures and are modern in every way, comparing favorably with any workingmen's homes in the city. These will be rented to the employees for $26 per month, not including utilities, and will be amortized over a period of 10 years. Mr. Bowden is also investigating the feasibility of a pension

• Left to right: H. Wyninegar, general manager; E. L. Baker, plant superintendent; and J. E. Bowden, owner.



• A general view of the Bowden Concrete Products plant, Memphis, Tenn., with the office in the foreground.

• Above: Cubing blocks in the yard before stacking. The yard accommodates 150,000 units.

• Left: The high-capacity (800 units per hour) block machine, with the batcher and the mixer above.

plan, an ambitious project for a small company with only 17 employees.

Sound sales and promotional methods were used to build up the company's business and to keep it growing. Originally Mr. Bowden did all the selling, calling on architects, contractors, engineers, dealers, etc., and using various forms of advertising. He early realized the advantages of selling through dealers and spent two months establishing his present sales setup with them. He now does no direct selling but has five dealers who sell in Memphis and a 25-mi. radius around it. These dealers have 17 salesmen and provide a coverage not otherwise possible. He also has established a trade area of roughly a 50-mi. radius around Memphis and has 53 dealers in this area. A minimum of 2,000 blocks are on consignment at all times with each of these dealers.

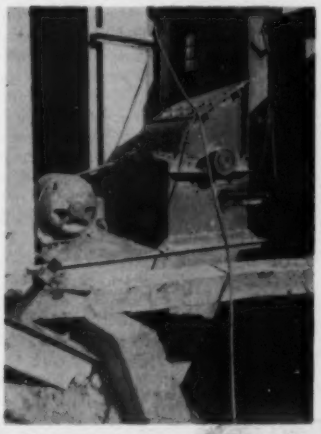
In addition to supervising all other phases of the business, Mr. Bowden now spends much of his time working with these dealers. He also calls on the local architects regularly, keeping them informed on all new developments with respect to concrete blocks. He participates with the dealers in newspaper advertising, and in exhibits at fairs and home shows. At the Mid-South Fair of 1951 an operating model of a Besser Vibrapac machine was exhibited and 5,000 colored yardsticks were given away. Mr. Bowden also does some premium advertising, giving away pencils and similar items.

In order to create interest in concrete blocks for home construction, Mr. Bowden decided to build model homes. He did so well at this that to date he has built 104 houses in three subdivisions. Customer contractors are hired to do the masonry work. Acceptance of his product is indicated by the fact that he has supplied lightweight blocks for 13 city schools. The largest order to date was for 192,000 solid 4- by 6- by 8-in. light-weight blocks for the Pine Bluff (Arkansas) Arsenal 153 miles away. The blocks made in this plant are accepted for all types of construction: for example the 926 dairies within a 50-mi. radius take a substantial share of the output. It is also interesting to note that whereas in 1950 only 5 percent of the output was light-weight blocks, this figure has now risen to 30 percent.

The plant building is a 40- by 80-ft. structure of concrete block and steel frame with a metal roof and steel sash windows. The office building alongside the plant is a 2-story concrete block structure 18 by 65 ft. with 13-in. thick walls and large Thermopane windows on the plant side, which give the staff and customers an excellent view of block-making operations. Soffit tile ceilings and radiant heat are other features, and an air-conditioning system has just been installed. Both structures form an excellent advertisement for the company's products, as 40 of the 42 types and sizes of products made are used in their construction. Wire cloth reinforcing used in all mortar joints has helped to prevent any cracking.

The aggregates, local washed sand and gravel and McDearman (Baton Rouge) lightweight clay aggregate, are received by car or truck and are discharged to the plant hopper. A belt feeder and bucket elevator handle these aggregates to three compartments of the 400-ton Heltzel bins, one for sand, one for gravel, and one for lightweight aggregates. Cement is also received by rail and is fed by screw conveyor and elevator into a 450-bbl. Heltzel cement bin. These ingredients are measured into a Heltzel weighing batcher, and the mixing water is measured by a Niagara meter. No admixtures are used. Mixing time in the 50-cu. ft. Besser mixer is measured by a watch. The Besser Super Vibrapac block machine is a standard installation equipped with a pneumatic offbearer and a magnetic pallet return. An unusual feature is the use of a bucket elevator to return all waste from the floor back to the mixer before it sets. There is also a Praschak cinder crusher for breaking down culls to torpedo size (⅜-in.) which is then fed by a belt conveyor to the aggregate elevator. These culls are collected by a Hough Payloader which

• Left: Stacking blocks four cubes high with a lift truck. Right: The tractor-shovel feeding aggregates from the stockpile into the track hopper.



• Above: The crusher used for breaking down culls for re-use as aggregate.

• Right: The Bowden exhibit at the Mid-South Fair of 1951, featuring a model of a block machine such as the one in the plant.

is also used for handling aggregates from stockpiles and for general utility.

The Clark high-lift fork trucks and one Motolift lift truck do all handling in the plant and yard. The 72-block racks are handled into the three 13- by 7- by 65-ft. curing rooms for which steam is supplied by a Campion-Detroit accelerator. These have a total storage capacity of 8,000 blocks. After two hours in the kiln steam is turned on until a temperature of 170 deg. F. is reached and is then turned off. The blocks are then left in saturation for five hours before drying out. In the yard the blocks are removed from the racks into 75-block cubes (for 8- by 8- by 16-in. blocks) by a Besser yard hoist or cuber. Storing 4 cubes high, the 1 1/3-acre concrete-paved yard has a capacity of 150,000 blocks.

The use of the best available materials, equipment, and methods pays off in economical production of high-grade blocks. The yield is 22 standard gravel concrete blocks per sack of standard cement. These blocks are of uniformly high strength, averaging from 1,400 to 1,500 lb. in 28 days, which is far in excess of requirements. It is from this point on, according to Mr. Bowden, that there is room for considerable improvement, as careless handling of the blocks in unloading from trucks at the job and on the job will break corners off the soundest and strongest blocks. An overhead monorail and hoist on the truck for unloading in cubes works very well except on hilly ground, which unfortunately is common in this area.

Versatile Batching Plant

Mix selector and repeater make wide range of mixes available

By WILLIAM M. AVERY

• The selector dial provides for ½-, ¾-, and 1-cu. yd. batches in slumps of 4, 5, and 6 in. and strengths of 2,500 and 3,000 p.s.i. Six open stations designated by letters can be set up for other strengths or slumps, as desired.

mother ON THE SPOT report

FOR about a year now the Ready Mixed Concrete Company of Covington, Ky., has been operating a batching plant which incorporates outstanding features of automatic control, particularly in respect to mix selection. Designed and built by C. S. Johnson, the plant represents an important milestone in the steady progress toward the day when manual batching can be completely eliminated from ready-mixed-concrete operations.

One of the remarkable features of the plant is that it incorporates a 1-cu. yd. batcher, despite the fact that truck mixers with capacities up to 5 cu. yd. are regularly loaded. The 1-cu. yd. batcher operates in conjunction with a 24-mix selector and a repeater mechanism allowing maximum flexibility in the selection of pre-set batches which can be weighed out automatically. The selector permits weighing out ½-, ¾- and 1-cu. yd. batches in four slump selections to produce 2,500- and 3,000-p.s.i. concrete, and the repeater provides for instantaneous automatic rebatching for as many cycles as are required to produce the desired total batch.

This arrangement makes it possible to turn out batches ranging from ½ to 5 cu. yd. in increments of ¼ cu. yd., but for certain batches it is necessary to reset the selector during the 15-second discharge cycle. The accompanying table shows the settings required to produce mixer charges ranging from ¼ to 5 cu. yd. for a given strength and slump. Of the 19 mixer charges shown, 6 require resetting the selector to obtain the desired total batch. Use of the 24-mix selector in combination with the repeater mechanism makes available a total of 152 batch combinations without manual weighing.

The system has important advantages other than the wide range of pre-set batches for which it provides. The small batcher requires considerably less headroom than would be required for a conventional non-repeating unit capable of delivering batches of the same size. The use of a number of relatively small batches to make up the desired mixer charge is said to have an effect comparable to premixing the materials before they enter the truck mixers, thus resulting in more thorough mixing and in a marked reduction in "ball-up" and "build-up" inside the drums. Increment batching also reduces the possibility of overflowing the charging hoppers of the truck mixers, which sometimes occurs when an entire charge enters at one time.

The design of the batching plant at Covington was to a large extent an outgrowth of the insistence by Fred J. Miller, part owner, that fractions of a cu. yd. be set up on the mix selector. His previous experience had indicated that a majority of the serious batching errors occurred in connection with weighing out fractional cu. yd. batches, and that one of the major objectives of an automatic batching setup should therefore be the elimination of this hazard.

Of the 24 mix selections provided in the design only 18 are actually used as pre-set mixes, these providing for the 2,500- and 3,000-p.s.i. concrete called for on the majority of orders. The six remaining settings, which are designated by alphabetical letters on the selector dial, are reserved as "open stations" to pro-

• A general view of the Ready Mixed Concrete Company's batching plant at Covington, Ky. Bins at the right are for reserve storage of about 1,400 tons of aggregate.

Mixer Charge Cu. Yd.	Repeater Setting (Repetitions)	Mix-Selector Setting (Cu. Yd.)	Re-Set Mix Selector		Produces (Batches)
			To (Cu. Yd.)	After (Repetitions)	
½	1	½	..	..	One ½ yd.
¾	1	¾	..	..	One ¾ yd.
1	1	1	..	..	One 1 yd.
1¼	2	¼	½	1	One ¾ yd. & one ½ yd.
1½	2	¾	..	..	Two ¾ yd.
1¾	2	1	¾	1	One 1 yd. & one ¾ yd.
2	2	1	..	..	Two 1 yd.
2¼	3	¾	..	..	Three ¾ yd.
2½	5	½	..	..	Five ½ yd.
2¾	3	1	¾	2	Two 1 yd. & one ¾ yd.
3	3	1	..	..	Three 1 yd.
3¼	4	1	¾	1	One 1 yd. & three ¾ yd.
3½	7	½	..	..	Seven ½ yd.
3¾	5	¾	..	..	Five ¾ yd.
4	4	1	..	..	Four 1 yd.
4¼	5	1	¾	2	Two 1 yd. & three ¾ yd.
4½	6	¾	..	..	Six ¾ yd.
4¾	5	1	¾	4	Four 1 yd. & one ¾ yd.
5	5	1	..	..	Five 1 yd.

vide for occasional orders which call for 2,000-p.s.i. concrete.

The repeat method of batching is said to result in an actual reduction in the time required to charge a given truck mixer with conventional facilities. Each cycle of batching involves a time lapse of about 15 seconds, and the average total time for loading 5-cu. yd. rear-charge truck mixers is around 1 min. and 45 sec.

The Covington plant is a transit-mix operation, but the batching system used is equally well adapted to central-mix setups. The plant proper consists of a TY-400 Johnson 200-cu. yd. welded bin with four compartments for aggregates and a central cement compartment partitioned to accommodate two types of cement. Aggregates are received mainly by rail, and are elevated and discharged into fully enclosed storage bunkers from which the batching bins are fed, the two storage systems being interconnected by means of a handling system consisting of a belt conveyor and a bucket elevator.

The cement storage system consists of two 1,030-bbl. steel silos with a single 7- by 12-in. cement bucket elevator between them. The elevator serves not only for placing incoming cement in the silos, but is also used in combination with a cross-over screw conveyor for reclaiming and feeding the 240-bbl. supply hopper in the batching plant. The cement and aggregate handling systems have capacities of 300 bbl. and 150 tons per hr.

The plant is equipped with four separate 2,500-lb. capacity batchers for sand and fine, medium, and coarse aggregate, and two 2,000-lb. capacity batchers for water and cement. All six batchers are completely automatic. Automatic compensation can be made for moisture in the sand by merely setting a dial. The two plug-type two-position fill valves with which the cement batcher is equipped permit immediate selection of either of the types of cement in the supply compartment.

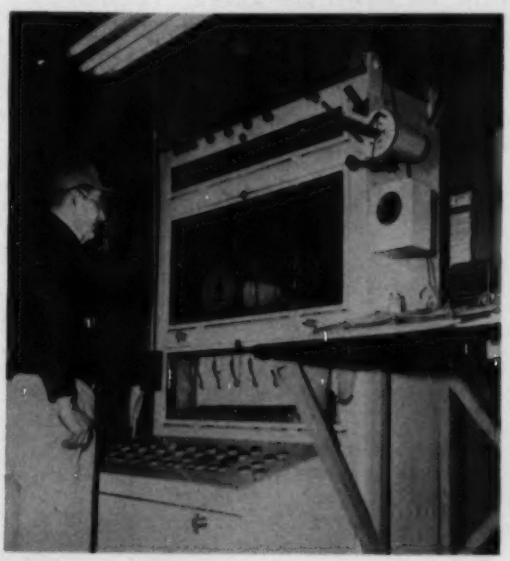
A central dial scale control unit controls all the batchers and provides a pen recording of the amount of the various materials weighed out. This provides the operator with a constant visual check on the operation of the equipment. He is immediately aware if a portion of a batch hangs up, since the graphic record shows both the full and the empty weight of each weigh hopper. The central control unit is also equipped with time and date stamp, relays, pushbuttons, lights, and similar features usually provided in fully automatic batching plants. The glass-enclosed air-conditioned control cabinet is kept under lock and key as a precaution against unauthorized changes in the settings.

To charge a 5-cu. yd. mixer the operator first sets the mix selector for a 1-cu. yd. batch of the particular slump and strength desired. Then he sets the repeater dial on the number 5, pushes the batch button, and the plant does all the rest. If a fraction of a cu. yd. is involved in the order, it is the usual practice to batch the fractional amount first, and then to reset the selector on 1 cu. yd. for the remainder of the charge. The operator has an interval of about 15 seconds in which to make this change.

In order to provide for all possible contingencies, the plant was also equipped for manual batching, but during the first year of operation the pre-set automatic control features handled 95 percent of all orders. An alternate mix can be set up on the selector in about 5 minutes. Between 7:30 in the morning and 3:00 in the afternoon the plant readily batches out up to 600 cu. yd. of concrete.

Another noteworthy feature of the installation is the special jacketed charging cone which the Johnson company developed. The jacketing principle was adopted in order to keep the water for a given batch separate from the other materials until the charge actually leaves the cone. Weighed water from the batcher passes through the jacketed portion of the cone on its way to the truck mixer drum, thus enclosing the dry materials, which are discharged at the same time, with a complete curtain of water.

This arrangement not only effects an appreciable reduction in the amount of dust released in the charging process, but also results in better ribboning of the water with the cement and aggregates. Since the water and the dry ingredients do not come into actual contact until they have left the cone, there is little opportunity for materials to build up inside the cone. An electric drive motor adjusts the cone



• A view of the control cabinet. Batch weights are indicated on dials above and recorded by pens below. The arrow points to the 24-mix selector.

• A truck-mixer receiving materials from the jacketed charging cone. The truck driver operates a pushbutton to adjust the cone vertically to the height of the truck.

• One of the company's 5-cu. yd. truck-mixers under the batching tower.

vertically to accommodate truck mixers of various heights.

The somewhat unusual layout of the Covington plant was dictated largely by the circumstance of its being located between two rail sidings. This made it necessary to locate the cement storage silos in line with the batching plant, and to utilize a fairly long overhead screw conveyor to feed cement into the bins.

The main aggregate storage facilities are also in line with the batching plant and between the two sidings. These consist of seven totally enclosed elevated bunkers, each of which holds about 200 tons of material. The filling system consists of an undertrack hopper, a bucket elevator, and an overhead shuttle conveyor. The bunkers discharge through manually operated gates onto a belt conveyor which discharges into the batching plant aggregate elevator. All the bin compartments in the batching plant are equipped with Johnson high and low bin gauges.

Although it is not normally used for batching operations, the adjoining storage plant is actually fully equipped for auxiliary batching operations. Each of the seven bunkers has a manual batcher below it, and there are steam lines to maintain full flow of material during cold weather. Both visible and audible signals, actuated by Bin-Dicators, show when the storage bunkers are full or empty.

The company follows a somewhat unusual practice in connection with winter operations. Instead of heating the aggregates and the water to obtain concrete of the desired temperature, only the water is heated. While this requires more hot water and at a higher temperature than would otherwise be the case, it eliminates the wide variations in aggregate moisture content when live steam is used for heating. The hot water storage system is of sufficient capacity to permit batching out as much as 20 cu. yd. in even the coldest weather without replacement.

All points in the plant are interconnected by means of a speaker system. As a further protection against mistakes in transmitting verbal orders, the company will soon install a Telantograph system by means of which order specifications written in the office will automatically and simultaneously be recorded on the control floor.

The company's fleet of 26 truck-mixers (all Jaegers) range from 2 to 5 cu. yd. in capacity. The mixers are mounted on White, Ford, and Hug chassis. Partners in the business, which originated in 1930, are, in addition to Mr. Miller, Stephen M. Maloney and George W. Cook. Later this year the company will expand its operations by establishing a second batching plant at the town of Erlanger, Ky., about seven miles southwest of Covington. When this installation is completed, the present truck-mixer fleet will operate from both plants.

Industry Journal Features Besser and Huron Portland

Featured in a recent issue the *Michigan Tradesman*, an attractive pictorial journal packed with interesting information about the state's industries, was the city of Alpena, Mich., home of the Besser Manufacturing Company and site of a Huron Portland Cement Company plant.

More than eight pages were devoted to the personnel and facilities of the Besser firm, which turns out equipment for the concrete products industry. Alpena Cement Products Company, one of the users of Besser equipment, also takes its place among the Alpena industries as a producer of concrete and lightweight masonry units.

An aerial view of Huron Portland's Alpena plant, known as "the world's largest", makes an impressive two-page spread, which shows in a superimposed outline map all of the firm's producing and distributing plants—a total of 13, located in five of the Great Lakes states.

Plastic-Fortified Concrete Described at A.C.S. Meeting

Development of a plastic-fortified concrete which promises to be twice as strong as ordinary concrete was described recently at the 121st annual meeting of the American Chemical Society. The new type of concrete, said to be suitable for roads, floors, ceilings, and masonry, was presented in a paper prepared by Severo V. Amagna, Brian B. Mellor, and Professor J. M. Geist.

According to the authors, the product resists cracking, corrosion, abrasion, and impact because of the fortifying addition of polyvinyl plastic. It is self-curing in air at ordinary temperatures and humidities. Proportions of the mix are one part of plastic to five parts of cement.

Mr. Amagna is a chemist on the staff of the California-Texas Oil Company; Mr. Mellor and Professor Geist are members of the Massachusetts Institute of Technology staff.

Concrete Plant Flies Signals Giving Hourly Weather Tips

Although weather flags now are considered virtually extinct, they still have a strong appeal in the St. Louis, Mo., area, according to Concrete Incorporated.

For a long period the firm has flown the signals atop its mixing tower, to keep drivers and visiting contractors informed on the hourly weather changes—a valuable and convenient service. Besides, company personnel members report that there are frequent calls from others not connected with the industry who inquire about the flags.

William W. Martin, 48, sales manager of the Cranford Company, Inc., Brooklyn, N. Y., concrete manufacturers, died on March 18 in a local hospital.

A Safe Driving Program That Works

Classed as an unsatisfactory insurance risk in 1947, W. E. Anderson Sons Company of Columbus today has one of the nation's best safety records.

By WILLIAM M. AVERY

another ON THE SPOT report

WHEN the National Ready Mixed Concrete Association presented this publication's 1950-51 Class A safety trophy to W. E. Anderson Sons Company of Columbus, Ohio, several weeks ago, we wished it had been possible to tell the assembled industry representatives a little of the human-interest story back of the event. The company's achievements in the field of safety, outstanding though they are, provide no hint of the tremendous sustained effort that has been put forth, nor of the almost insuperable obstacles that have been surmounted. In telling the story here we hope to accomplish several objectives—to pay a well-deserved tribute to the company itself for its accomplishments in the cause of accident prevention; to provide some sort of yardstick against which other concerns may measure their own efforts in that cause; and to outline what we believe, and the experience of the Anderson Company seems to prove, are some of the basic fundamentals of an effective safety program.

The Anderson company operates a fleet of about 100 vehicles, including 42 ready-mixed-concrete trucks and an equal number of dump units. Its drivers operate entirely on the crowded streets of Columbus and on the busy highways adjoining the city. On an average work day total fleet mileage is somewhat more than one-third the circumference of the globe, and in 1951 all units piled up the astounding total of almost 2,613,000 miles.

The operation of 100 baby buggies under similar conditions would be an inconceivably hazardous business. When the rolling stock consists of towering mixers, loaded with 20,000 to 25,000 lb. of fluid concrete, the exposure to mishap becomes tremendous, and the problem of accident prevention assumes almost monumental proportions.

The Columbus firm, which will celebrate its 30th anniversary late this year, operated for a good many years without a formal, concerted safety program. That is to say, they exhibited neither more nor less concern about accident prevention than is true today of many companies which have an equally valid interest in the problem. The company's active concern with safety dates from the day about five years ago when it received a peremptory notice from its insurance carrier of a 150 percent increase in the premium it was paying on public liability and property damage insurance.

A quick check through such records as were available revealed that accidents had been occurring at increasingly frequent intervals, and that they were taking a heavy toll in terms of reduced operating effi-

• Ralph H. Anderson, president of the company, is an enthusiastic advocate of vigorous safety work as a matter of sound business.

• Norbert D. Eckert, public relations and safety director of W. E. Anderson Sons Company, receiving Pit and Quarry's Class A safety award at last winter's annual meeting of the National Ready Mixed Concrete Association. At the left, presenting the plaque, is Robert Mitchell, member of the Association's executive committee.

• The company's numerous trophies for outstanding safety work are proudly displayed in a glass case located in the foyer of the main office.

• The insignia for the first, second, third, and fourth- (and subsequent) years of safe driving for the W. E. Anderson Sons Company.

ciency and loss of good will. Ralph H. Anderson, president of the company, and N. D. Eckert, now public relations and safety director, spent several months in a personal, detailed, and close-range study of the problem.

One of the most enlightening things they did was to follow the company's own trucks around the streets of Columbus for several weeks —of course, without the drivers' knowledge. They found that most of the operators were not only persistent violators of the basic rules of safe driving, but were guilty of repeated and wholly needless breaches of simple courtesy. Company trucks were observed hogging the center of the road, stopping, turning, or performing other maneuvers without signaling, and driving at velocities better suited to the Indianapolis Speedway than to the streets of a crowded city.

Clear evidence was also noted of a similar disregard for the rights and convenience of customers. Little or no effort was put forth to prevent damage to customers' property in the course of making deliveries, and standards of courtesy in dealing with purchasers or their representatives were no better than those displayed toward the general public.

Fully persuaded that their own drivers were largely responsible for the company's poor safety record, Mr. Anderson and Mr. Eckert undertook a careful survey of accident-prevention programs among other concerns, and adapted to their own requirements what they regarded as the best features of a number of such programs.

They started on the excellent premise that accident prevention had to be considered just as important a part of the company's business as sales or production, and that it was a full-time job which demanded the closest and most intelligent supervision. At the same time they recognized that any plan of attack which they might develop would stand little chance of succeeding unless it appealed to the employees themselves. These two principles have governed all the company's subsequent efforts to work out an accident-prevention program which would safeguard the lives and property of the general public, protect employees, and assure the continued prosperity of the firm itself.

Anderson's safety program did not appear suddenly in its present form, nor does the company now regard it as a finished piece of work. It has evolved gradually during the five-year period since the initial studies were made, and it will probably continue to evolve and improve for as long as the company remains in business. The process appears to be one of constant refinement—trying new approaches that seem to have promise, and scrapping or amending old practices when experience shows them to be of questionable value.

After five years of unremitting effort the company has evolved a many-sided attack upon the problem of accident prevention which can best be described by the words "tough but fair". It is a tough program insofar as it allows for no coddling of those who wilfully violate the rules under which it is administered; it is a fair program in that it provides generous rewards for safety achievements, as well as penalties for bungling. The method of placing responsibility is also scrupulously fair, since offenders have the same opportunities for self defense and self exoneration that are provided under our legal system.

The safety program actually starts functioning *before* drivers are hired. All applicants are carefully studied and screened with a view to their acceptability from the standpoint of probable performance. Previous work records and reports of involvement in accidents are closely scrutinized to weed out poor or doubtful risks.

If he passes this initial screening process, the applicant is hired on a probationary basis. For at least the first week of his tentative employment he rides with one of the company's four safety team captains. Driving rules, special hazards, procedures to be followed at the point of delivery, and all other aspects of the work are carefully explained and thoroughly discussed. If, after three days of this initial indoctrination, the team captain believes the new man is ready to roll, he permits him to take the wheel for the first time. The team captain stays with him for the remainder of the week, carefully studying performance and correcting mistakes. At the end of the week the team captain reports to the management on the probationer's performance.

If the report is favorable, another experienced driver is assigned to ride with the new man during the first three days of the following week. His report, in combination with the observations of the safety captain, then becomes the basis upon which management decides whether or not the employment is to continue.

This careful screening is by no

• Good food, good fellowship, and a common interest in the cause of safety furnish an occasion for frequent get-togethers of Anderson employees.

means the end of surveillance. Plant dispatchers are under instruction to observe drivers at every opportunity, noting their attentiveness, alertness, and general deportment. This is done on the theory that many an accident occurs because the driver involved is under par physically, or worried about finances or other personal problems. When such accidents-in-the-making are noted, the employee in question is called in for a conference, and every effort is made to help him over his difficulty.

Obviously many of the company's rules for safe driving must bear a close resemblance to similar rules which exist in most organizations. But some, by reason of special wording or emphasis, are worth repeating here. There is, for example, a sort of blanket instruction that Anderson drivers operate their trucks on the basis that every other driver on the streets is a congenital idiot, and that in consequence the full burden of preventing accidents rests on their own shoulders. The company's rule book, *The How and Why of Your Job*, states it in more formal language, but the meaning is the same.

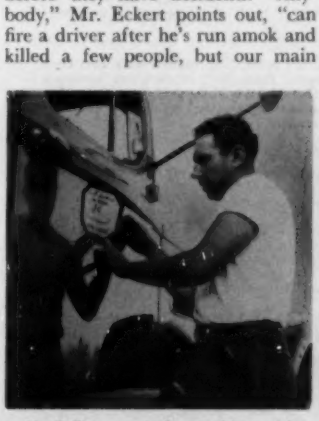
Anderson drivers are instructed not to back up unless it is absolutely necessary to do so. When the maneuver can't be avoided, they are expected to get out of their cabs and size up the situation as often as necessary, and without regard to loss of time, in order to prevent a mishap.

If an Anderson driver is out with a company truck and suspects that he is too sick, or too mad, or too sleepy to discharge his duties safely, he is expected to stop at once and telephone the office for a relief man to be sent out. This practice, rare though it is, is just another aspect of the company's belief that if you want to prevent accidents, you must be prepared to adopt some inconvenient measures.

All drivers are under strict orders to stop their trucks at once if brakes are faulty, and a flagrant violation of this rule may become cause for immediate discharge. Thorough and frequent brake inspections are made on all vehicles, and worn parts are replaced at once, with the result that rear-end accidents are definitely placed in the inexcusable category.

If an Anderson driver receives a ticket for a traffic violation and is convicted and fined, he is charged with an accident in the company records, even though no actual damage may have been involved. If he fails to report the incident, he is charged with two accidents. This practice may seem rather severe, but it reflects the company's belief that the primary purpose of a safety program is to eliminate careless or dangerous practices *before* they culminate in serious smashups, since the same thoughtless maneuver that results in a scraped fender today may be responsible for a fatality tomorrow.

Thus a primary function of the company's entire safety program is to weed out accident-prone drivers before they have accidents. "Anybody," Mr. Eckert points out, "can fire a driver after he's run amok and killed a few people, but our main business is to act before that happens." As has been indicated, Anderson drivers are under almost constant scrutiny. The company has three expediters and three salesmen on the streets of Columbus most of the time. These individuals carry regular forms for reporting on the performance of drivers. When a driver is reported for some violation of good practice, he almost invariably accepts responsibility.



• H. Collins, an Anderson driver with a record of over three years of accident-free service, proudly affixes a safety emblem to the door panel of his truck.

Anderson trucks are kept in top-notch condition at all times, and the company has a regular replacement schedule which virtually eliminates the possibility of accidents due to equipment failure. Each unit of the fleet is completely reconditioned once a year—bodies stripped down to bare metal and repainted, and engines, fittings, and various worn parts replaced.

Each driver has a particular truck assigned to him, and is expected to keep it in top appearance condition. All necessary materials, tools, and supplies for this purpose are provided by the company, and drivers are paid for cleanup work at their regular rate. The four safety captains assist the safety director in making monthly inspections to assure that truck-condition regulations are complied with. Since there is no fixed date for such inspections, the drivers have little choice except to keep their units in a constant state of readiness.

The Anderson company pays $10 per month per driver into a special safety bonus fund. At the end of each month each driver who has operated without an accident being charged to his record is paid a bonus of $10, less any penalties that may have been assessed against him for truck inspection demerits. Each inspection demerit reduces the safe-driving bonus by the sum of one dollar. However, if the same fault is found the following month the penalty jumps to $3; it hits $6 on the third inspection, and wipes out the entire $10 safe driving bonus if it recurs in the fourth month.

Bonuses lost due to accidents and inspection demerits are accumulated in a special fund which is divided at the end of the year among the accident-free drivers. Last year, for example, drivers with a 4-year no-accident record received $305; those with a 3-year record received $205; those with a 2-year record received $187; and the 1-year men received $152.

When an incident occurs involving a company truck, Mr. Eckert or

some other qualified member of the organization goes to the scene immediately. Pictures are taken, sketches are made, and all available witnesses are interviewed. Since this practice was adopted, the company has been able to collect on 10 to 12 claims a year, where formerly none were collected.

The report of the incident, including the driver's version of what took place, is carefully studied by a reviewing board composed of the four safety captains, an insurance company representative, a company representative and Mr. Eckert. Formal hearings are held, and all the facts are considered before any decision is reached regarding the driver's responsibility.

If the driver is exonerated (which is often the case), the incident is closed and no mention of it appears in his record. If the board decides that the driver was guilty of negligence, the reason for their decision is explained to him fully and carefully. In the vast majority of the cases the driver himself is fully satisfied that the decision is fair.

The status of any Anderson company driver with respect to accident-free driving can be determined at a glance by looking at the right door panel of his truck. If he has driven two months or more without an accident, the panel carries a yellow octagon-shaped insigne trimmed in black which is changed every week. During the first year of accident-free driving the insigne shows the number of miles driven; during the second year it shows the number of weeks; during the third year it shows months; and for the fourth and subsequent years it shows the number of years driven without accident and the driver's name.

This year the company paid out over $12,000 in bonuses to its drivers. Just from a hard-headed business point of view, however, this appears to have been as sound an investment as could possibly have been made. The tangible results show up most plainly in a comparison of driving performance in 1947, the year before the program was officially launched, with the record for 1951.

In 1947 the company operated 62 units a total of 1,115,000 miles. There were 53 over-the-roads accidents, 17 personal injuries, 419 lost-time truck hours, and 81 property damage claims. Last year 85 units were driven a total of 2,613,000 miles, or more than double the exposure in 1947. There were 3 over-the-road accidents, no personal injuries, 35 lost-time truck hours, and no property damage claims.

This year the company is operating six more trucks than in 1951, and the insurance premium is $7,500 less. The tremendous reduction in lost-time truck hours has resulted in lower operating costs and better customer relations all along the line. And employee morale, for obvious reasons, is at the highest level in the company's history.

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Atlas Concrete Products Co. Sold to A. W. Walker and Son

Purchase of the Atlas Concrete Products Company, Mt. Sterling, Ky., has been announced by the A. W. Walker and Son Construction Company of Mt. Sterling. R. J. Reynolds, Harry Combs, Dan McDonald, and Vance Evans were the former owners of the Atlas firm. No change was made in the operating personnel.

Bealer Chappel, who has been with the Walker Company for a number of years as bridge and culvert superintendent, has been placed in charge of the newly-acquired block plant.

Frederick W. Reinhold, president of Anchor Concrete Products, Inc., Buffalo, N. Y., was presented recently with a plaque to signify that his firm's display had taken top honors at the Buffalo Better Homes Exposition. The first prize, won in competition with 190 exhibitors, was presented to Mr. Reinhold by G. Lawrence Mitchell, president of the Buffalo Better Homes Exposition, Inc.

Michigan Products Plant Develops Multiple Market

By ROGER R. NOLAN

A general view of the Kent Block Company at Grand Rapids, Mich., taken from the roof of the office building. The section of the building bearing the plant name houses the four overhead aggregate storage bins and the cement storage bin, while the part directly above houses the elevator receiving hopper and the turnhead.

another ON THE SPOT report

ALTHOUGH the Kent Block Company is a comparatively new plant in the concrete products industry, it has, since going into operation in 1947, become one of the leading producers in the area it serves. Located on the outskirts of Grand Rapids, Mich., this firm maintains an appliance and hardware supply store in addition to its fine block plant. The store, which is adjacent to the company office, affords block customers an opportunity to purchase any additional building supplies they may require.

The well-designed plant, which produces cinder blocks, bricks, chimney blocks, lintel blocks, and curved manhole blocks in addition to standard masonry units, is equipped with two Super Vibrapac block machines, a Besser lintel machine, and a Besser manhole block machine. The Vibrapac machines turn out a combined total of approximately 10,000 units in a normal 8-hour working day.

Aggregate is brought to the plant and discharged into a receiving hopper by 5-cu. yd. trucks. From the receiving hopper the aggregate is carried to four Butler overhead storage bins by means of a perpendicular bucket elevator. The buckets empty the material into an overhead hopper which is equipped with a turnhead.

Bulk cement is brought to the plant by carrier truck and discharged into a second receiving hopper, an undertrack screw conveyor and a bucket elevator delivering the material to a 320-bbl. overhead bin. A Butler traveling weigh-batcher accurately measures out cement and aggregate, and separately discharges the materials into either of the two Besser 50-cu. ft. mixers which supply the block machines. Water is added through a series of openings in a horizontal pipe extending the full length of the mixer.

Back of the section which houses the block machines is a room containing the manhole block machine and the lintel machine. The manhole block machine turns out four sizes of curved manhole blocks at a rate of approximately 180 a day, whereas the lintel machine is operated only occasionally to fill specific orders.

Curing is done in ten spacious kilns at the plant. A Johnston boiler generates the low-pressure steam for the process. Steam is injected into each of the ten curing rooms by means of a short-stem pipe off the main steam line, the outlet being situated at the upper right hand corner of the entrance to the curing room. A hand-operated valve is provided for each outlet to regulate the injection. The Kent firm uses a power fork-lift truck to remove the filled Chase racks from the block machines to the curing rooms. Each room has a capacity of 20 racks.

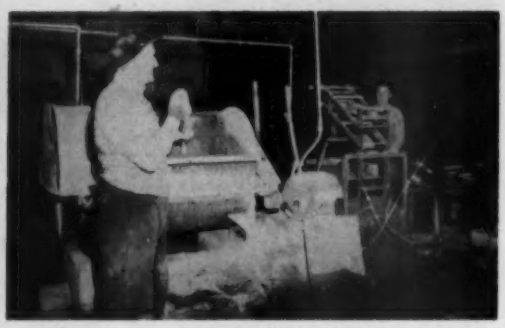
After the curing cycle, which takes from 8 to 12 hours, the blocks are removed from the rooms and transported to stockpiles located at the front and on one side of the plant. A Hendrickson fork-lift truck serves the purpose

The plant office building, showing the hardware and appliance showroom adjacent to the main office. Henry Everse, owner and president of the firm, and Harry Wolcott, company salesman, pose at the entrance of the building.

Shown here is the weighing apparatus of the traveling weigh-batcher, which provides for the accurate measurement of cement and aggregate to be discharged into either of the two mixers. Operator Lester Corkins stands by to deliver the material.

One of the two block machines in operation at the plant. The operator is Ralph Dykstra. In addition to standard masonry units, the company produces haydite, cinder, Waylite, and concrete bricks.

Bob Doster, fork lift truck operator, starting to enter one of the curing rooms with a rack full of 8-in. standard blocks. The horizontal overhead pipe in the background is the main steam line from the boiler.



The manhole block machine is operated by Mart Verburg, and George Hamner runs the mixer. The machine turns out four sizes of curved manhole units at the rate of approximately 180 a day.

This picture shows the interior of one of the ten curing rooms maintained at the plant. The two racks at the rear are filled with 8-in. standard concrete blocks. Each room holds 20 racks.

A view taken from the roof of the office building shows the storage yard. The flat truck in the foreground is one of six used by the company to transport blocks to its customers.

of transferring the blocks to and around the storage yard.

Officers of the Kent Block Company are Henry Everse, president and owner; Roger Everse, plant manager; and Harold Everse, secretary-treasurer. Approximately 30 individuals are employed, and a fleet of six trucks is maintained.

NEW MACHINERY and SUPPLIES

● Fork Lift Trucks

Two additional fork trucks have been announced by the Buda Company, Harvey, Ill. — the "FT30-15" and the "FTD30-15." The first has a 49-hp. gasoline engine, while the second has a

diesel engine. Both engines have identical bore, stroke, displacement, and mounting dimensions. They also have removable wet sleeve cylinder liners.

The trucks are rated at 3,000-lb. capacity at 15-in. center. Fork lift heights are from 72 to 120 in. raised.

● Hydraulic Crane

A hydraulically operated crane for installation on any truck of 1½-ton capacity or larger is being produced by The Pitman Manufacturing Company, 300 W. 79 Terrace, Kansas City 5, Mo.

The Pitman Hydra-Lift Model "B" requires only 40 in. of space behind the

truck cab and has a lifting capacity of 6,400 lb. The swinging boom telescopes from 12 to 22 ft. The boom is raised hydraulically and is swung by means of double-acting hydraulic cylinders, while the load line is controlled by a winch powered from the truck motor by a universal joint.

The Hydra-Lift was developed for pipeline work but has been used for similar purposes such as setting septic tanks, sewer pipe, and in erecting prefabricated concrete wall sections.

● Concrete Additive

An additive for reducing water absorption of concrete not subjected to hydrostatic pressure has been announced

Heltzel BUILDS IT BETTER

HELTZEL HELPS
CONSTRUCTION DOLLARS
GO FURTHER

NASSAU DOCKS, INC.
REORDERS HELTZEL BINS

Often empties over
3 bins per hour

PROBLEM: To have overhead storage of 1½", ¾", ⅜" stone and run-of-crusher limestone screenings which are delivered in barges; to fill and empty the bins quickly into trucks having 14 to 16-yard capacity; to deliver aggregates in proper proportion from the same bins to an asphalt plant on a conveyor belt. These were the Nassau Docks, Inc., problems.

SOLUTION: Nassau Docks, Inc., ordered four 18-foot diameter, 150-ton capacity Heltzel bins, and at a later date, six more. A two and one-half yard clam-shell loads the bins. For discharging, double-acting clam-shell gates (16" x 16") operate from the ground level. During busy days at Nassau Docks, three or more bins are emptied per hour. The superintendent says that any one of 4 aggregates, or any combination of them, can be moved on the conveyor belt to the asphalt plant.

●Nassau Docks, Inc., furnishes aggregates for its own asphalt plant, for contractors and Hendrickson Brothers, with whom Nassau Docks is allied. Specialized Heltzel engineering features circular and square bins; 50-degree sloping sides of cone; a choice of clam-shell, single arc or roller gates ranging in size from 12" x 12" to 30" x 30" which are air or manually operated.

Ease of assembly is testified to by steel erectors time after time. Heltzel has solved hundreds of similar problems effectively; so why don't you write regarding your storage, loading, mixing, unloading, batching or materials handling problems?

Heltzel BUILDS IT BETTER

The Heltzel Steel Form & Iron Company

Construction Equipment Since 1910

WARREN, OHIO

Flex-plane

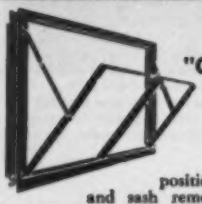
For better, stronger window installations

VENTO

STEEL BLOCK LINTELS

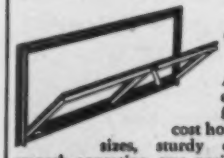
Ample load bearing capacity for windows or doors. Available from 2-ft. 6-in. to 5-ft. Formed from 10 gauge hot rolled steel with stiffening crimp in center. Beveled edge provides masonry bond and seat for mortar. Saves costs through use with standard 8-inch blocks. Vento pressed steel angle lintels for brick construction also available.

VENTO STEEL BASEMENT WINDOWS



VENTO "CHAMPION"

Three sizes. Effortless operation gives three position ventilation and sash removal. Double contact with leak-proof water-shed sill stops wind and rain. 14 gauge electric welded frame. Fins welded to jambs for easy installation in block or poured walls.



VENTO "THRIFTY"

A real economy window for lower cost housing. Three sizes, sturdy construction, smooth operation, two position ventilation and easy sash removal. Fin flanges at jambs for quick installations.

***Also** casement, utility and barn windows. Write for full information.*

VENTO STEEL PRODUCTS CO., INC.
254 COLORADO AVE. BUFFALO 15, N.Y.

by the Master Builders Company, 7016 Euclid Avenue, Cleveland 3, Ohio.

This material, "Stearolith," is claimed to make possible the use of slabs for houses without the use of porous underfill covered with a waterproof membrane. In addition to reducing the porosity of finished concrete, the material also is a cement-dispersing agent and adds this characteristic to the mix. It is used either as powder or liquid, and may be handled by automatic dispensers.

● Plastic Dotted Glove

A work glove that utilizes plastic dots set into canton flannel to prevent wear has been introduced by the Riegel Textile Corporation, P. O. Box 170, New York 17, N. Y.

The "Plastic Dot" gloves are claimed to give several times the wear of ordinary gloves and with only a slight increase in cost. Their use is said to reduce glove costs substantially and to protect the hands of the users.

● Synthetic Resin

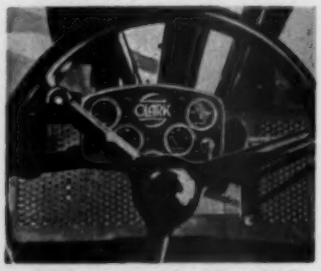
A vinyl copolymer synthetic resin for use in concrete mixtures is being introduced by American Polymer Corporation, Peabody, Mass.

This material, "Polyco 470," acts as a dispersing agent for cement in concrete mixes and reduces the water-cement ratio. It is also claimed to increase the tensile strength of concretes made with it. The use of the synthetic is said to give a marked improvement in the properties of concrete without the necessity of moist curing.

● Instrument Panel

An improved instrument panel is now being used on all gas-powered Carloader and Clipper fork trucks made by the Clark Equipment Company, Industrial Truck Division, Battle Creek, Mich.

The panel includes fuel, temperature, and oil-pressure gauges; a meter; ignition switch; horn; starter button; and Mico brake button.



The instruments are mounted so that they are protected by a metal case and heavy glass faces. Connecting wires are in a metal channel. While well protected the instruments and wiring can be easily removed or repaired.

● Masonry Waterproofer

A masonry paint that is said to control seepage of water through floors, concrete masonry walls, and other masonry surfaces is being marketed by Rox Products, 9930 Freeland Avenue, Detroit 27, Mich.

The material is applied as a paint under normal applications, but where excessive seepage is occurring, it may be applied dry in cracks and holes to stop the flow. The paint can also be mixed with sand to make a mortar for repairing disintegrating masonry surfaces. It is supplied as a powder that is mixed with water to produce the waterproof masonry paint.

● Block Unloader

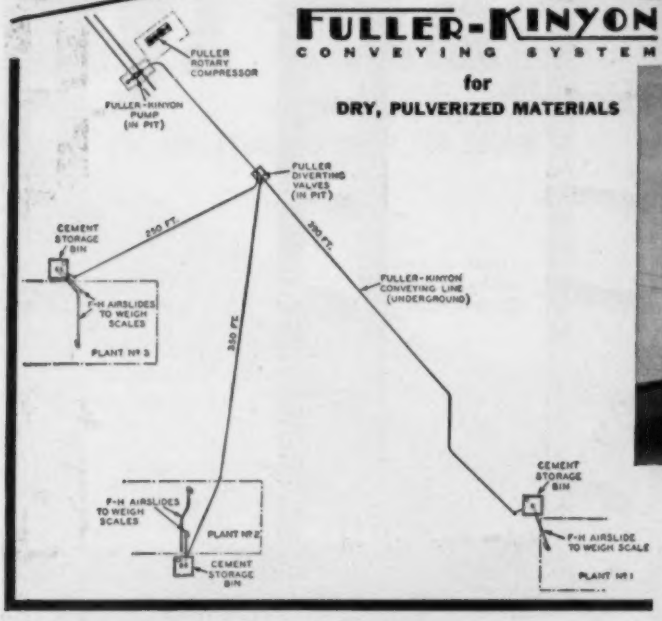
An unloading device for trucks hauling concrete blocks, brick, and similar materials is being manufactured by Arthur Rehberger & Son, Newark, N. J.

The device consists of a special tilting top and mechansim that is mounted on the truck. The bed is equipped with rollers and the load is gently eased off by releasing a holding cable arrangement. It is said that a load can be discharged at the delivery point in less than ten minutes with virtually no breakage. The savings in time and manpower are claimed to be so great that one truck equipped with the unloader can replace up to three conventional units.

Adaptable . . .
Flexible . . .

ANYWHERE A PIPE LINE CAN BE RUN

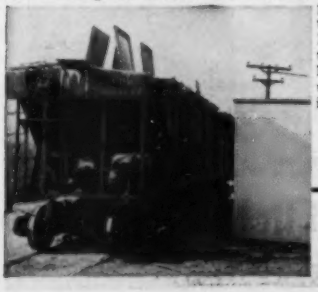
FULLER-KINYON
CONVEYING SYSTEM
for
DRY, PULVERIZED MATERIALS



Unloading . . .
conveying underground . . .
to three delivery points

The layout of the concrete-products plant shown above, really three plants in one, necessitated unloading all shipments of Portland cement at one particular location, but distribution to storage had to be made to three widely scattered points.

The engineers of this plant turned to Fuller for suggestions and aid in selecting the most efficient and economical method for handling the cement. As a result of studies made, and proposals submitted, they selected the Fuller-Kinyon System. Note that all conveying pipe lines are installed underground, eliminating all structural interference above ground in the yard.



Cement, received in hopper-bottom cars, is conveyed by the Fuller-Kinyon Pump, located in a pit underneath the tracks, to all storage bins, by the use of Fuller diverting valves in the transport line. The system has a capacity of 200 barrels an hour.

Conveying cement from bins to weigh scales over mixers in the plant, is accomplished by using F-H Airslides, manufactured by us. Airslides are equipped with F-H Airfeeders and F-H air-motor-operated cut-off gates, above the scales, for perfect control of each batch, in addition to clean operation and minimum power consumption.

Fuller engineers will gladly make a survey of your conveying and submit their recommendations, based strictly upon your particular needs. This, without any obligation, of course.

Fuller

FULLER COMPANY, Catasauqua, Pa.
Chicago 3 • 120 So. LaSalle St.
San Francisco 4 • 420 Chancery Bldg.

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS AND ASSOCIATED EQUIPMENT

P-137

A lot of Blockmakers Choose MODERN *Chase*

CONCRETE BLOCK RACKS

■

Good Reasons for

Chase

Installations

■

Cost no more than ordinary racks

■

Built of corrosion resistant high strength alloy steel

■

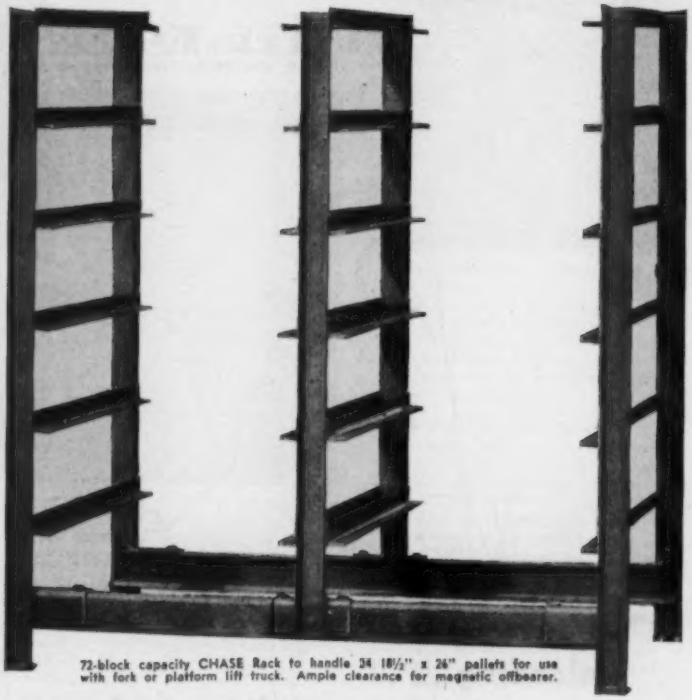
Improved rigid side sill connection

■

Easily assembled. Require no special tools or welding

■

Shipped knocked down for low freight cost



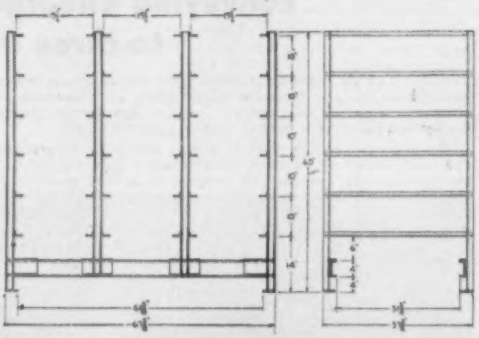
72-block capacity CHASE Rack to handle 24 18½" x 24" pallets for use with fork or platform lift truck. Ample clearance for magnetic offbearer.

The progressive concrete block producer needs the best racks available to complement his block-making equipment.

That is why manufacturers all over the country insist on CHASE Racks that combine practical design with sturdy construction. These CHASE Racks are furnished in any style or capacity rack or car.

PALLETS

We can supply plain steel pallets to any size required, as well as pallets for rack shown above.

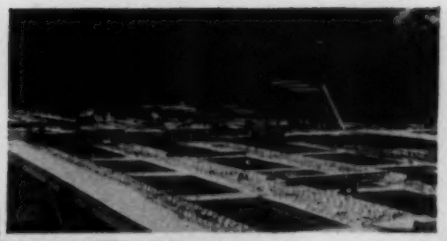


72-block capacity, 3-compartment Rack, for handling either 19½" x 19½" or 18" x 18" pallets.

CHASE RACKS — CARS & TRUCKS

CHASE FOUNDRY & MFG. CO., COLUMBUS 7, OHIO

widely used,
widely endorsed



ayr trap

THE AIR-ENTRAINING AGENT FOR CONCRETE

a large ready-mix plant: "Having used Ayr-Trap for the past four years with very satisfactory results places us in a position to recommend it to all ready-mix concerns."

a concrete block company: "We heartily recommend Ayr-Trap. The quality of the block is much improved and the appearance much better. The whole operation in making the blocks is easier."

a general contractor: "Horn Ayr-Trap is very beneficial to our construction due to the type of aggregate we use. The Ayr-Trap controls the set of the mortar by functioning as a dispersing agent."

a mining company: "We are firmly convinced that the use of Ayr-Trap makes a much more workable concrete, that stripped work has a much better appearance with a much greater resistance to damage from freezing."

Used in the newest State Turnpike circle and bridge construction

for heavy concrete construction

Ayr-Trap can be added at batching plants or on the job.* It makes concrete more durable, increases its plasticity and minimizes segregation and bleeding. Increased plasticity with Ayr-Trap insures better placement of concrete in and around closely spaced reinforcing bars. Ayr-Trap develops high resistance to moisture absorption and attack from freezing and thawing forces.

road building

Ayr-Trap improves scaling resistance and protects pavements against the destructive action of chloride salts for ice, snow removal.

OTHER BENEFICIAL PROPERTIES

- Permits a reduction in the water cement ratio.
- Used in liquid form as follows:
  3 liquid ounces per cubic yard of 5 or 6 bag mix.
  1 pint for 5 cubic yards, 6 bag mix.

HORN

A. C. HORN COMPANY, Inc. est. 1897

Manufacturers of materials for building maintenance and construction

LONG ISLAND CITY 1, N. Y. • Los Angeles • San Francisco • Houston Chicago • Toronto SUBSIDIARY OF SUN CHEMICAL CORP.

A. C. HORN COMPANY, INC.,
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Please send me ☐ complete data on AYR-TRAP

HORN ☐ free copy of your 96-page Construction Data Handbook

NAME_____ TITLE_____

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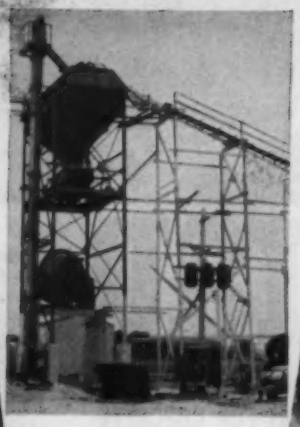
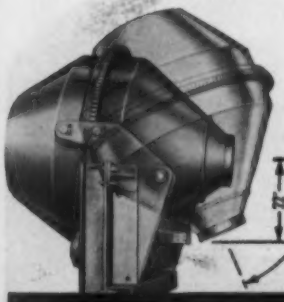
CITY_____ STATE_____





TILT-UP

CLEAN UP with

Only the SuPREMIX TILT-UP, 3-3½ yard hydraulically controlled mixer can give you *all* these advantages: lower headroom requirements—steeper discharge of 65°—no segregation—reduced thrust—and virtually fixed discharge. The hydraulic system is part of the unit—no costly compressor to buy. The unique features of this mixer make it the ideal mixer...

- » *Aggregate Bins*
- » *Cement Bins*
- » *Cement Storage*
- » *Elevators*
- » *Conveyors*

FOR CONVERTING TO CENTRAL MIX

As it requires less headroom, the TILT-UP SuPREMIXER is the only mixer feasible in most plants. It's easy to install, no raising of the plant or lowering of drive.

FOR A PACKAGE PLANT

Reduced headroom requirement means reduced height, construction and power costs. Efficiently permits dry batch in one lane, central mix in the other.

FOR A SEMI-PORTABLE PLANT

Crane feeding is easy with SuPREMIX. Separate A-frame mounting with bin structures bolted for quick, easy set up provide real flexibility for your rush defense jobs.

Ready Mix Plants • Expressway Semi-Portable Plants • Dry Batch Plants • SuPREMIX

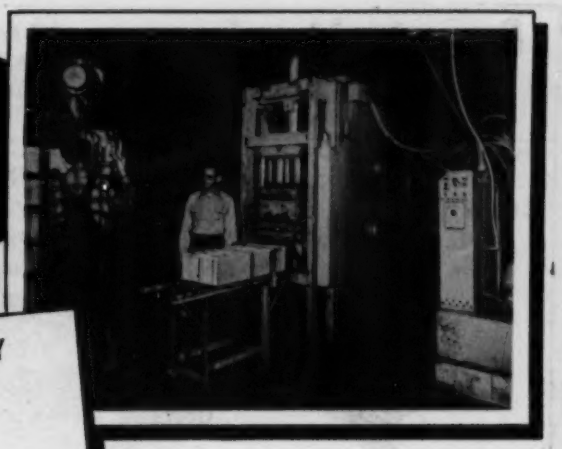
Manufactured and Distributed by

L. BURMEISTER

Milwaukee 14 **Wisconsin**

Blockmaster Best Buy

FOR THIS DENVER OPERATOR



VIBRATED CONCRETE COMPANY

PHONE TABOR 7707 • 55TH AND WITHEROOP STREETS

DENVER 8, COLORADO

April 7, 1952

Multiplex Machinery Corporation

Elmore, Ohio

Gentlemen:

We are happy to send you the enclosed order for our second Blockmaster machine, together with mold boxes, pallets and racks, as specified.

We want you to know that we are very much pleased with our first Blockmaster, which has been operating for six months now and has more than satisfied us. We are convinced that two of these machines will really do wonders for us.

Anything you can do to speed delivery of the new machine will be much appreciated.

Very truly yours,

VIBRATED CONCRETE COMPANY

Don Wheelock

Don Wheelock

Vibrated Concrete Company of Denver likes fast production of top quality block because it means greater profits. It's as simple as that. Finding their competitive position so improved with their first Multico Blockmaster No. 2 (pictured above) they want another as quickly as possible.

Both the Blockmaster No. 2 (2 blocks per cycle) and the Blockmaster No. 3 (3 blocks per cycle) are fully automatic machines, requiring labor only to offbear the block. They are hydraulically powered by a separate power unit which can also serve future machines. Machine action is smooth and quiet, and as the Blockmasters have 50% fewer moving parts than other machines, costly maintenance is kept at an absolute minimum.

The Blockmasters have an unbeatable compression action, producing perfect blocks. With their plain pallets they produce any size or style of block, with any aggregate.

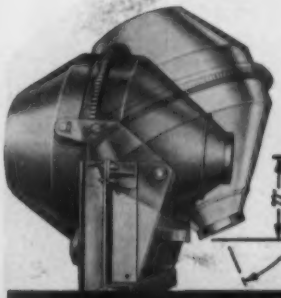
These up-to-date, proven machines can help you too; write or call Multiplex for more information.

Multiplex Machinery Corporation has been making concrete production machinery for over 40 years. Our engineers will help you plan your plant expansion. We can show you how Multiplex automatic block machines, mixers, skip hoists, and compartment aggregate bins can make your operations more profitable.

Left: the Multico Blockmaster No. 3. Choose this hydraulically powered machine for modern, high production performance.

MULTIPLEX MACHINERY CORPORATION

ELMORE • OHIO



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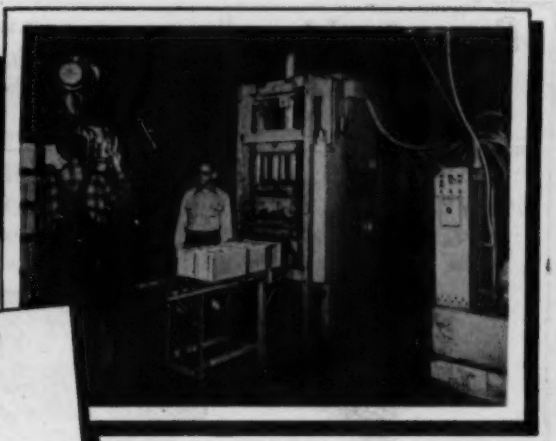

VIBRATED CONCRETE COMPANY

PHONE TABOR 7707 • 38TH AND WYNKOOP STREETS

DENVER 8, COLORADO

Multiplex Machinery Corporation April 7, 1962

Elmore, Ohio

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MULTIPLEX MACHINERY CORPORATION

ELMORE • OHIO

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[Additional Classified Ads on Pages 297-305]

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CONVEYORS - SCALES - FEEDERS - IDLERS

GUARANTEED EQUIPMENT — IMMEDIATE SHIPMENT

CINDER, PUMICE, PERLITE CRUSHERS

10 to 20 tons per hour capacity....$ 479.00
25 to 50 tons per hour capacity.... 1146.00
Complete with hopper

HEAVY DUTY PLATE AND PAN FEEDERS
Complete with motor and drive.
Priced from $423.00

TRUCK SCALES

20 Ton Truck Scales	$524.00
26 Ton Truck Scales	581.00
30 Ton Truck Scales	895.00

Other scales to 50 ton capacity. All truck scales complete with structural steel weighbridge. Replacement parts for most all makes of scales.

VIBRATING SCREENS

Heavy duty eccentric shaft types. One to five decks. Screening sizes from 3'x8' to 5'x14'. Priced from.....$1494.00

Screen cloth or plate included. Many smaller machines in stock. Screen cloth included. Prices start at $431.00.

Big Stock of cloth and plates.

Send us your want list.

BUILD YOUR OWN CONVEYORS & BELT FEEDERS

3-roll Troughing Idlers for these sizes:

14" belt	$16.50	24" belt	$16.75
16" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
42" belt	$21.00		

1-roll Return Idlers for these sizes:

14" belt	$6.38	30" belt	$8.25
16" belt	6.75	36" belt	8.75
24" belt	7.50	42" belt	9.50
42" belt	$10.25		

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. No bearing adjustments required. Easy to start and will run in cold weather. Rust-proof ball races; maintenance is negligible.

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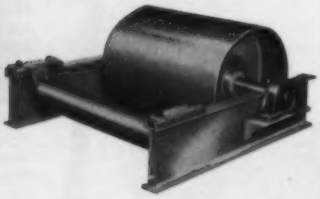

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This equipment is in clean, excellent condition.

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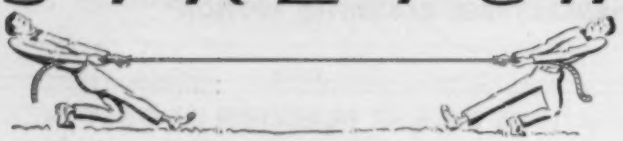

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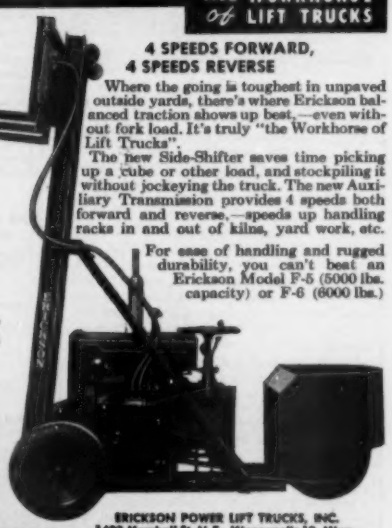

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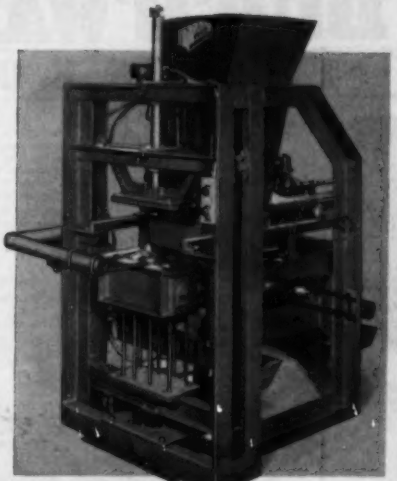

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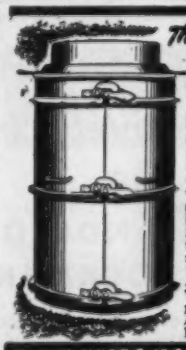

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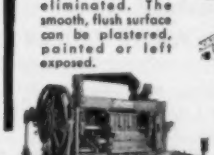

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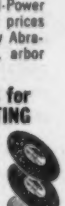

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UNI-TEMP insulated all-metal DOORS* & UNIVERSAL world-famous DOOR CARRIERS

**Doors also furnished hinge-mounted.*

Let us give you full information about the most efficient kiln closure equipment you've ever seen—at a cost that is probably *much* less then you expect!

Write, wire or phone: **UNIVERSAL DOOR CARRIER, Inc.**
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the **FORNEY** *Compression* TESTER

Sells Your Products... Increases Your Profits

● Daily testing of all concrete and concrete products increases yield, profit and customer confidence.

Write for full information

FORNEY'S *Inc.* 203 ELM ST.
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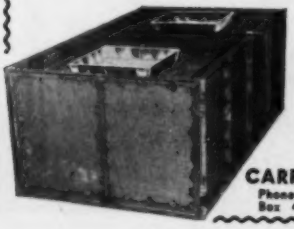
☒ **Preferred by Concrete Producers ... CARPENTER Septic Tank Forms**

and Handling Equipment are a coast-to-coast favorite for supplying quality units on a large-scale, economical basis. Using our Delivery Rig, one man loads, transports and sets tank in hole.



Write for full details

CARPENTER MFG. CO.
Phone 28938 — R.F.D. No. 1
Box 470, Richmond, Virginia

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truck-man runs
18,000 HOURS
without overhauling

Here's what Knox Concrete Products, Inc., Knoxville, wrote us when they placed an order for replacement parts recently:

"... We are not only well pleased but we do not believe there is a piece of equipment on the market which would serve our requirements any better ... Our normal load would probably run in the neighborhood of 4000 lbs. ... We now have four Truck-Men ... that run possibly *20 hours every day continuously* ... The cost of operating a Truck-Man is certainly extremely low, as it uses very little gas and oil ... We have had very little maintenance on this equipment."

"... After six years at approximately 10 hours per day steady running I find it necessary to rebuild the majority of gears, sprockets and other movable parts on one Truck-Man and prepare to do so on another ..." says Cement Block Industries, Coral Gables, Florida.

What more need we say? That last statement works out to approximately 18,000 hours of trouble-free operation. What would the record show if they had been using the *new* Truck-Man with its husky 5.8 h.p. Wisconsin engine? It's Truck-Man's low weight to payload ratio combined with rugged power that makes possible its unequalled efficiency in block-plant operation. You burn only a gallon of gas on most 8-hour shifts yet spot the heaviest racks in jig-time. Rubber cushioned ride, hydraulic lift, smooth start and stop mean no costly checking of blocks. Lower costs from purchase through maintenance and big savings in manpower—everyday—for years—make Truck-Man your *first* necessity for block handling. Available in skid, pallet, platform and *New* tractor models.

Send for full details in our new 1952 catalog.

truck-man Div. of The KNICKERBOCKER CO.
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Name_____

Title_____

Address_____

City_____ Zone____ State_____

BLOCK MACHINE EFFICIENCY AT ITS PEAK POINT

The New, Revolutionary

HYDRO-KORPAK

At last comes a block machine of streamlined compactness that brings low-cost automatic production within reach of men of modest capital. One that combines the four major objectives of scientific compacting . . . hydraulic operation, electrically controlled . . . one-man labor . . . and moderate price. All in order to produce a super-fine block — marked by the utmost in accuracy, smoothness and density — at remarkably low production costs. † Among the outstanding construction highlights is lateral compacting, whereby swiftly oscillating cores pre-densify the material in advance of the final intensive squeeze exerted by the powerful hydraulically operated ram. Thus is combined the combination of lateral and vertical packing, with uniform density in every cubic inch. † Regularly equipped to make nominal 8 x 8 x 16" in full and fractional sizes. Attachments available for four other thicknesses: 4", 6", 10", 12". Modular conformation in all dimensions, but can be supplied for making the old standard sizes. † Finely engineered. Precision built. Evidence of rugged construction is a gross weight of more than 2¼ tons. Compactness is shown by over-all dimensions of 90 inches long by 53 inches wide. Fully self-contained. † Write for copy of the new descriptive catalog.

The Superfine Block

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531 Ottawa Ave., Holland, Mich.

LARGE PROFITS PRODUCING

Smoother, thicker, more uniform

MARVEL DRAIN TILE

The better tile — Better looking Better selling

Low cost, ruggedness, and dependability make the

MARVEL, JR.

CONCRETE DRAIN TILE MACHINE

a must in plants both large and small. The MARVEL JR. is famous for the smooth, symmetrical, full flat-ended tile it produces—a big selling feature and the reason why your customer prefers them over tile made on more expensive competitive machines. Write for detailed bulletin at once.

CONCRETE MACHINERY CO.

DRAWER 60A HICKORY, N. C.

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NOW THE TRANSO Load Master

FRONT END LOADER

Model TL-50: ½—⅝ yard capacity—44" wheelbase — 72" dumping clearance — 85" height under bucket hinge — 63" turning radius — 45" maximum width.

With

1. NEW PATENTED LOADING METHOD of rocking . . . scooping . . . lifting the bucket.
2. CLUTCH TYPE REVERSING TRANSMISSION with spring-loaded clutches running in oil.
3. MAXIMUM SPEED and HANDLING EASE.
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7. LOW CARRYING POSITION OF BUCKET — results in higher efficiency — greater safety and dependability.

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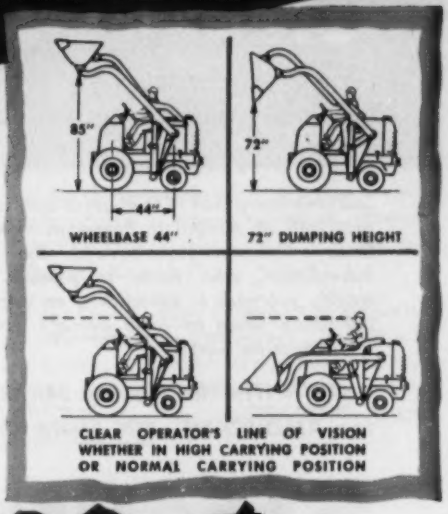

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THE TRANSMISSION & GEAR CO.

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TELEPHONE 18

LUMBER . . . . . READY-MIX CONCRETE . . . . . SLAG BLOCKS

CELOTEX PRODUCTS—CAREY BUILDING MATERIALS—MARTIN-SENOUR PAINTS

UNION CITY, TENNESSEE

May 31, 1952

Stearns Manufacturing Company, Inc.
Adrian, Michigan

Gentlemen:

We would like to take this opportunity to tell you how well pleased we are with our Stearns Model "50" Block Machine. Our Model "50" machine has built for us the reputation of manufacturing the best block in north-west Tennessee and south-west Kentucky.

With the Stearns Model "50" machine we produce 4800 blocks in an eight-hour shift, blocks with beautiful texture, high compaction and load-bearing strength due to Stearns uni-directional vibration under pressure. Also by using Stearns' pallet return and power off-bearer with our machine, we have only one man to do the work of three men. On top of all this, Stearns equipment is simple to operate and inexpensive to maintain.

To anyone contemplating buying block plant equipment may we recommend Stearns by all means for quality and service.

McAdoo Builders Supply

By Rush McAdoo

STEARNS 50

Stearns 50 in McAdoo Builders Supply. This great, one-man, 2-blocks-per-cycle concrete block machine has a simple, rugged mechanism and heavy frame members for high stability. Fully automatic, dependable, economical. Produces beautiful, compact blocks by Unidirectional Vibration under Pressure. Power handling of plain pallets.

Here in McAdoo's yard are examples of *"the best block in north-west Tennessee and southwest Kentucky,"* made with the Stearns 50. The plant covers 3½ acres, serves the area within 60 miles of Union City, furnishes "everything from foundation to roof."

From left, Robert W. (33), Gene C. (30) and James H. McAdoo (31), brothers and equal partners in the going Tennessee concern. All were in the Air Force during World War II—Robert, a Bombardier; Gene, in the Air Transport Command (60 round-trip Atlantic crossings) and James, a Pilot, flying B24s and B17s. Direct from high school to service, direct from service to the concrete block business, these veterans used small pumpers until their purchase last year of the high production Stearns 50 and *Success.*

Still another proof of that great and lasting principle of American Freedom in which Stearns has always believed:—*The rugged individualist, who dares to pioneer, most quickly succeeds in establishing an estate for the future when he owns outright the tools with which he works.*

OWN IT!—The Key to SUCCESS for AMERICANS—ON THEIR OWN!

STEARNS

MANUFACTURING COMPANY, INC.

ADRIAN • MICHIGAN

STEARNS 15 | STEARNS 50 | ZIPPERS | JOLTCRETES | MIXERS | SKIP LOADERS | TURNTABLES | SINTERLITE

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HERE'S THE ANSWER

Tough jobs, rough jobs, dirty jobs . . . where ordinary bearings fail . . . Shafers take over Shafer ConCaVex bearings are "ruggedized" throughout—in design, construction and functional capacity. Their reserve strength has paced the needs of every heavy industry for the past third century. Try them in the equipment you make or use—for longer life, greater dependability, less attention, better, faster, easier installation and adjustment. Ask for descriptive literature and engineering assistance. No obligation.

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- Performance proven for 33 years.

SHAFER
SELF-ALIGNING
ROLLER BEARINGS
INDUSTRIAL • AIRCRAFT

BEFORE — Johnson-March system turned off at the crusher in an eastern stone crushing plant. Compare this unretouched photo with the one at the right.

AFTER—Note absence of dust when Johnson-March system is operating at this same crusher. These systems have proved themselves with many rock-crushing plants. We'll be glad to furnish names.

STOP DUST

at 1/10 the usual cost!

The many successful installations of Johnson-March Systems testify to their effectiveness. No matter where the dust occurs . . . jaw crushers, cone crushers, conveyors, screens, unloading bins, stacks . . . dust can be controlled or eliminated.

Ducts, fans and other cumbersome equipment are not necessary. Installation is simple and inexpensive . . . on the average, the cost is only 1/10 as much as other types of dust handling systems. There is no interference with normal plant operations.

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throughout the life of the screen

When Hendrick Perforated Plate is used on vibrating and shaking screens, not only does the mesh remain uniform throughout the life of the screen, but the screen gives economically long service.

Furnished either flat or corrugated, its full clearance practically obviates clogging, and the ease with which decks can be changed minimizes labor costs.

Available with any desired shape and size of openings, Hendrick Perforated Plate can be supplied in the proper gauges of regular, high carbon and stainless steels, and in other commercially rolled metals.

Write for a copy of Hendrick Perforated Plate Catalogue

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Perforated Metals
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Architectural Grilles
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RUGGED AC ENGINES Cost less

Ability to develop torque quickly makes A-C Power Units ideal for crushing and other sudden overload jobs.

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—because they are *mass produced* along with engines by the thousands for tough tractor service. Users benefit from these savings, as well as interchangeability of parts and other advantages of mass production.

There are further savings in getting *exactly* the power needed. Any power requirement can be filled economically with the four sizes of A-C Power Units—15 to 74 b. hp. They can be used singly or two or more together.

-to use

A-C Power Units run inexpensively on gasoline, low-grade fuel, natural gas or butane. Their "tractor service" stamina keeps them on the job during critical work periods—avoids loss of valuable time due to shutdowns, helps build product acceptance and good will. Service facilities are nation-wide.

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ALLIS-CHALMERS
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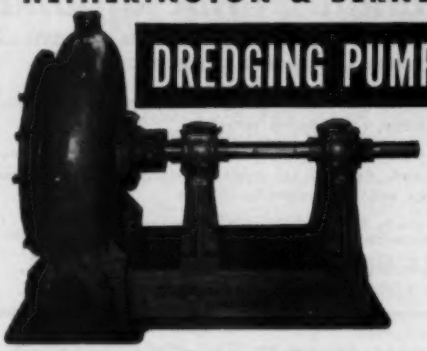

performance-proven on the toughest jobs

H&B ESTABLISHED 1867

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Write for Bulletin DP-147.

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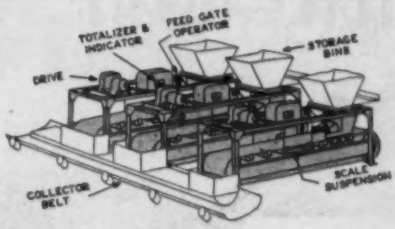

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Automatically transport, weigh, indicate, integrate, totalize tonnage and maintain a pre-set rate of feed for blending raw materials.

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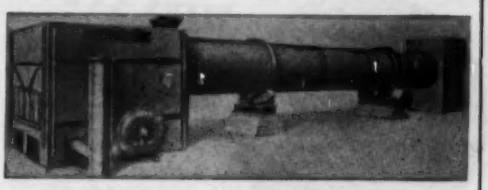
DRYERS & KILNS . . *for all purposes*



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BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

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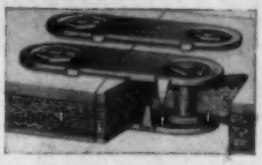
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.



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★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

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YOU CAN'T BEAT this widely esteemed "workhorse" for versatility, output, endurance, and operating economy.

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You have a job to do—and "Little Giant" can handle it better!

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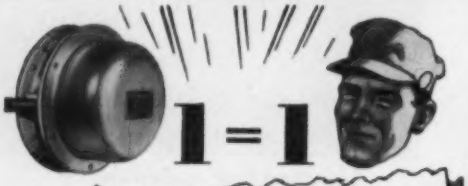

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NEW 1952 CATALOG FREE

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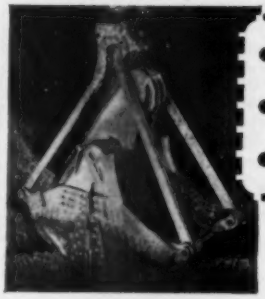
DESIGNED FOR HANDLING



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For complete information, construction details and specifications . . . WRITE FOR BULLETIN 2378

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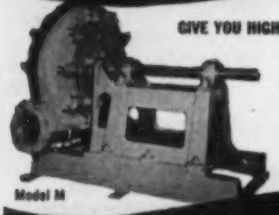
FOR CEMENT PLANTS

Lightning SAND & GRAVEL **PUMPS**

GIVE YOU HIGH CAPACITY AT LOWEST COST...



Model M

Lightning Semi-Heavy pumps deliver against 90-ft. heads, pump 9 yds. an hour from 3-in. size. Also 4, 6, 8-in. sizes. Lightnings have the lowest first, replacement and operating costs of any pump built. Write for information.

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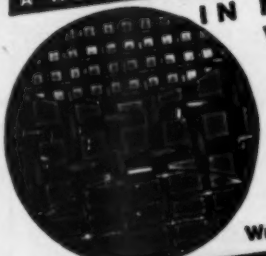

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State age, experience, references and salary expected.

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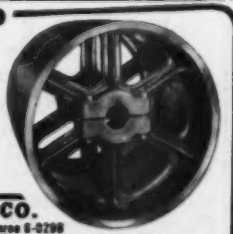

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16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
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30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
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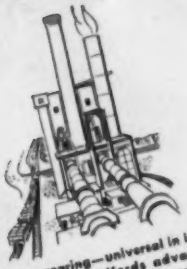

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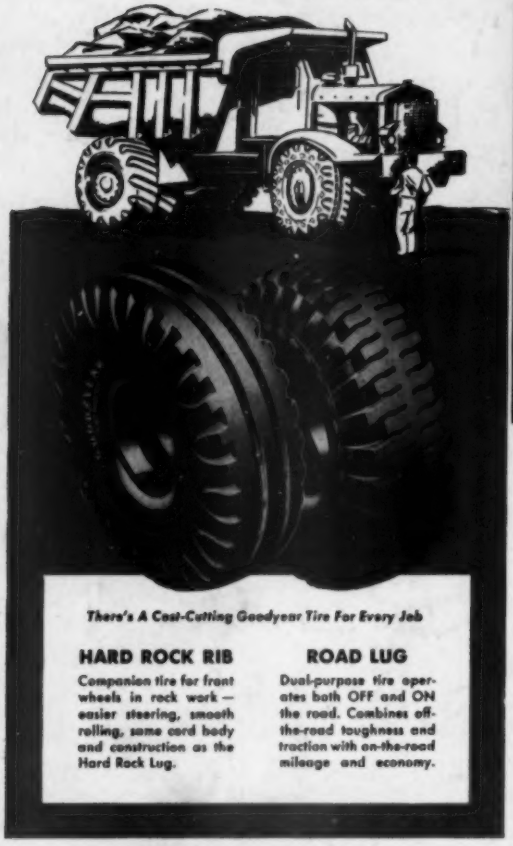

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